

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2566.—VOL. LIV.

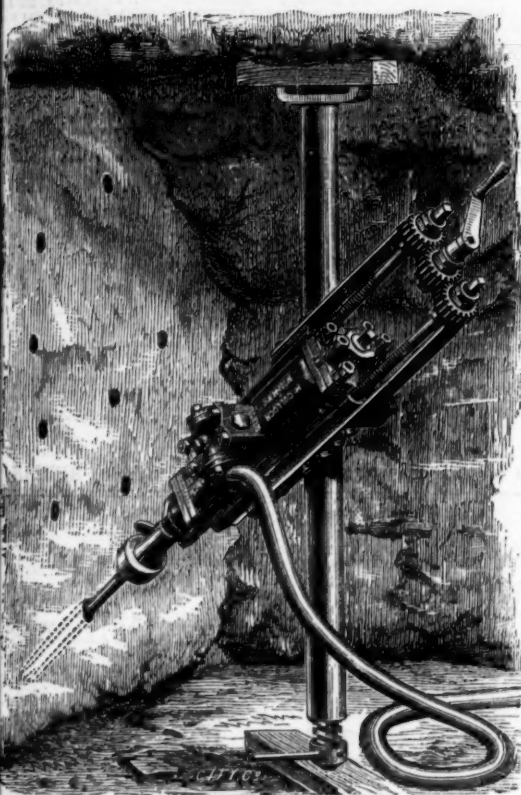
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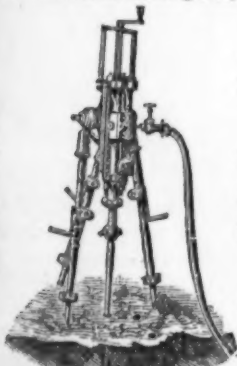
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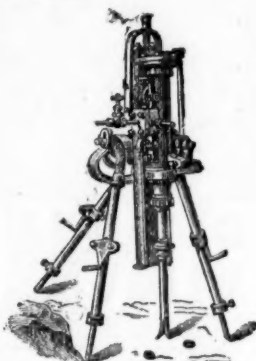
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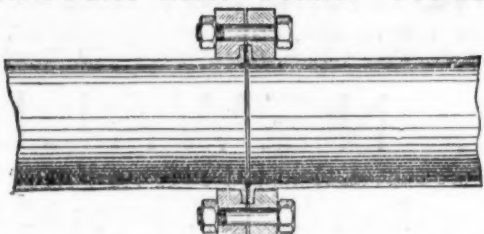
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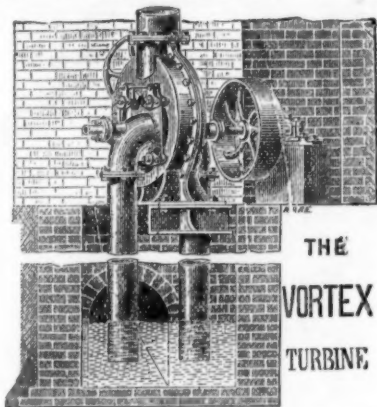
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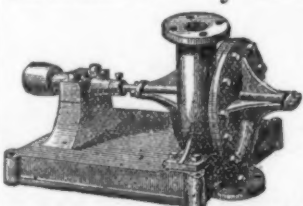
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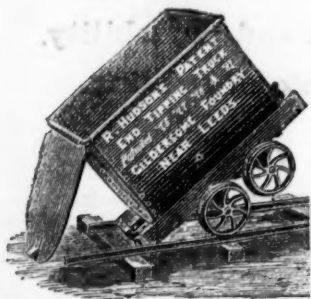
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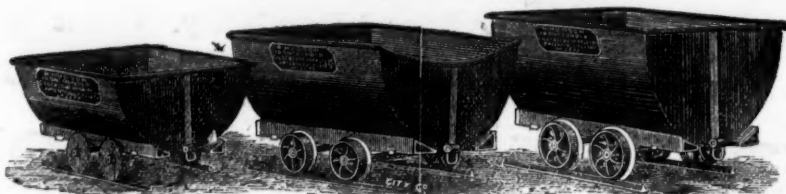
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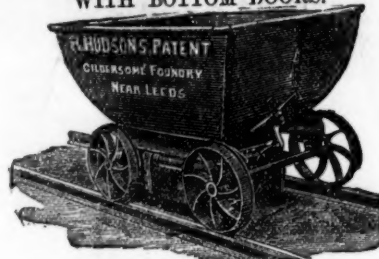
1.—PATENT STEEL END
TIP WAGONS.



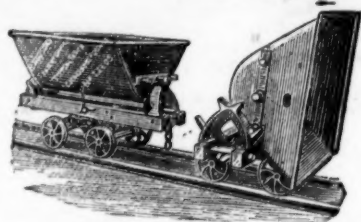
7.—PATENT STEEL MINING WAGONS.



12.—PATENT STEEL HOPPER WAGON,
WITH BOTTOM DOORS.



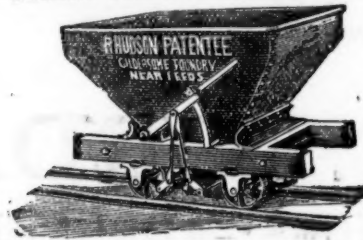
2. PATENT UNIVERSAL TRIPLE-CENTRE
STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



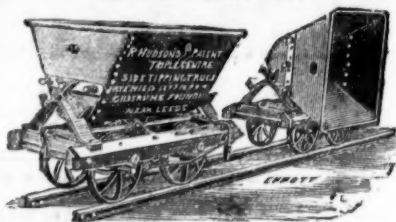
8.—PATENT DOUBLE-CENTRE STEEL
SIDE TIP WAGONS,
Will tip either side of Wagons.



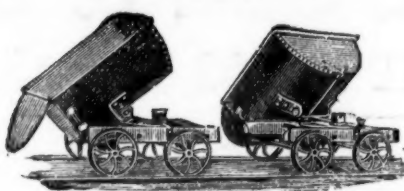
13.—PATENT STEEL HOPPER WAGON.



3.—PATENT TRIPLE-CENTRE STEEL
SIDE TIP WAGONS.



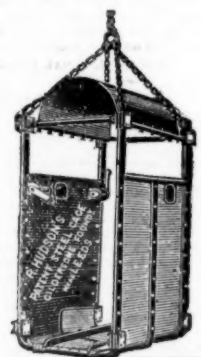
9.—PATENT STEEL ALL-ROUND TIP
WAGON.



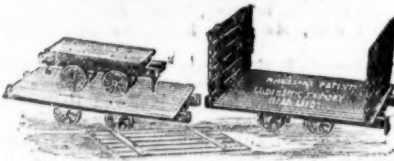
14.—SELF-RIGHTING STEEL
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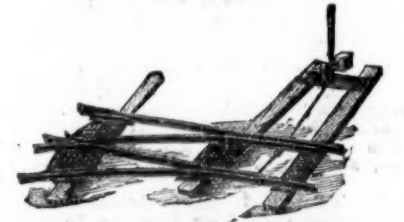
15.—STEEL CAGE.



4.—PATENT STEEL PLATFORM OR
SUGAR CANE WAGON.



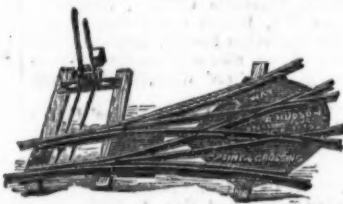
10.—LEFT-HAND STEEL POINT AND
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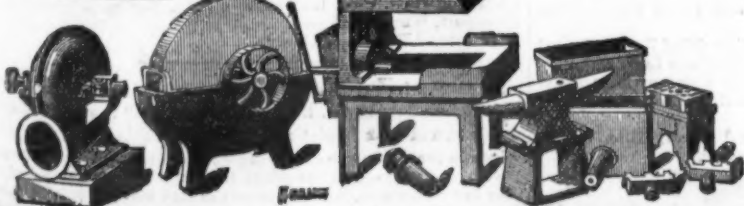


11.—RIGHT AND LEFT-HAND STEEL
POINT AND CROSSING.



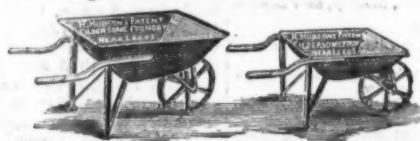
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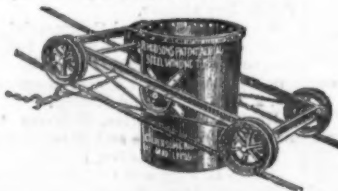


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FROM THE LONDON GAZETTE, SEPT. 30.

The Registrar of Joint-Stock Companies has given notice, pursuant to s. 7 (3) of 43 Vict., ch. 19 (Companies Act, 1880), that at the expiration of three months from the date hereof the names of the under-mentioned companies will, unless cause is shown to the contrary, be struck off the register, and the companies will be dissolved:—

* (NOTE.—An asterisk prefixed to a name signifies that another company with the same or a similar title is believed to be carrying on business at the present time.)

African and General Trading, Allithwaite Iron Mining, Amazon Trading, Angliham Marble and Stone Quarries, Galway, *Anglo-Australian Steam Navigation, Anglo-German Tunnelling, Anglo-Swedish Peat Ball Patent Fuel, Anglo-Swedish Steam Cutting Mills, Anglo-Swedish Wire Iron and Mount Coal, Arabian Hair Cloth, Aubigny Stone Quarries, Automatic Ship Ventilator, Alarm, and Bilge Pump.

Banagher Distillery, King's County, Ireland (registered Feb. 5, 1873), Barrow-in-Furness Mutual Plate Glass Insurance, Basford Springs Laundry, Baths and Laundry of Deptford, Bath Traders' Co-operative, Birmingham and Harrowbarrow Mining, Blaenafon and Cefn-y-Van Freehold Colliery, Boulogne Harbour, Bower's Allerton Collieries, Bradford Co-operative, Bramcote Colliery, Brecknock Colliery, Bridgefield and Victoria Salt, British and Foreign Fresh Meat (Postle's Process), British and Foreign Paving, British Columbia Collieries, Briton Ferry and Swansea Steam Tramways, Broadstairs Pier, Buckingham Plumbago, Butchers' Wool, Hides, Skins, and Fat.

Caledonian Brewery, *Cambrian White Lead and Chemical, Campbell's Law Agency, Canada Tanning Extract (registered Feb. 22, 1873), Cape Breton (registered May 14, 1873), Carden Mining, Cash Indicating Gas Meter, Central City (Colorado) Mining, City Rock Silver Mining Civil Service Review, Club Co-operative (registered Dec. 23, 1872), Club Co-operative (registered Feb. 4, 1873), Coal Consumers', Coal Gas Improvement, Cob Stud Farm, Commercial Loan and Deposit Bank, Commission Business Trading, Newfoundland Merchants, Consolidated Atlantic Telegraphs, Crockford's Auction Hall.

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Lanchester Gas, Landport and Cosham Omnibus, Lichfield Co-operative Cheese Factory, Little York Gold Washing and Water,

Llanbedrog Quarry, Llanberis Copper Mining, Llandilo Mining, Llanelltyd Silver-Lead Mining, Llantwit Coal Consumers, London and Central City (Colorado) Gold Mining, London and Egham Wheel, London and Provincial Theatre, London Cattle Importing and Atlantic Trading, London Enamel, Long Ditton Land, Luggage and Parcels Express, Lymington Water.

Magneto, Manchester and District Co-operative Coal, Merton Flock and Wool, Midland Counties Brewery, Mining Adventurers of Utah, Morben Slate and Slab, Mortgage Debenture and Government Securities Trust.

National Anglo-Spanish Bank, Natural Seltzer Water Company of Nassau, Newborough Silver-Lead, New Estate and House Agency, Newland Patent Brick and Tile, Newlyn Pier and Harbour, North Cornwall Stud, Northern Counties Steam Shipping, Northern Territory of South Australia, Northwich and Mersey Salt, Nottingham Foresters Club and Hall.

Oakwell Collieries, Ojen Mountain Magnetic Iron, Old Merryfield Lead Mining, Ottoman Ice.

*Patent Anthracite Fuel, Patent Jacquard Apparatus, Patent Pipe and Boiler Foundry, Patent Selenitic Cement, Patent Whalebone, Photo-Mechanical Engraving, Pier Hotel (Margate), Pitsmoor Omnibus, Portsmouth Steam Towing and Shipping.

Quicksilver Association.

Railway Mortgage Debenture Bank, *Railway Share Trust (registered April 9, 1873), Redaelli Amalgam Silvering, Retford Gas and Coke, Rhenish Silver, Lead, and Zinc, Ripley Public Hall, Ross and Monmouth Collieries, Rugby Temperance Hall, Russian Coal.

Saint Lawrence Gold Mining, Santander Zinc Mining, Scart Barytes and Minerals, Scientific Societies' House, Shanghai and Assam Tea, Sheffield High Moor Colliery, Shoreditch Local Press, Silber Light, Somerset Peat Coal, *South London Tramways, South Wales Dinas Fire-Brick, South-Western Civil Service Co-operative, South Yorkshire Coal and Iron, Sovereign Fire Office, Stapleton Coal and Iron, Stura Valley Mining and Smelting, Submarine Salvage, Swedish Paper.

Taurine (registered Feb. 13, 1873), Tecoma Silver Mining, Texas Pressure Meat, Thomas W. Chambers and Co., Times Green Slate, Tranmere Shipping, Trevarth Fire Brick and Clay, Tyllwyd Silver-Lead Mining.

Union Quartz Milling, Universal Telegram.

Ventilating Closet, Victoria and Fenton Park Colliery, Victoria Wool, Walsall Working Man's Club, Welsh Dinas Fire-Brick and Silica, Wenner Lake Ice, West Bryn Celyn Lead Mining, West Indian Hydraulic Dock, West Llandudno Estate, Wilson Bunster's Aerial Transport, Winsley Colliery.

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AMERICAN LABOUR.—Replying to a correspondent on the subject of American labour, Mr. BURT, M.P., writes:—"I was in America last year, and took special note of the condition of the working classes in the mining centres. My observation leads me to the conclusion that though on the whole labour is better paid in America than in this country, the position of the man who has only his labour to depend upon is most uncertain in many parts of America. The chief advantage in that country is afforded by the openings and chances of obtaining land. The best and most accessible land is fast being appropriated, and I do not think the outlook for labour is exceedingly attractive."

Original Correspondence.

THE GOLDEN QUARTZ REEFS OF AUSTRALIA.—No. VII.

SIR.—Form of Reefs.—The intimate connection between the shapes of reefs and the strata can be further illustrated if your readers will take a piece of white notepaper and cut with a pen-knife a line in the form of a saddle-reef. Then take the two pieces and place them together (in their original positions) on a dark wooden table, or any other dark object with a smooth surface, keep the top piece fixed, and slightly withdraw from it the lower piece, when it will be observed that the dark space between the two pieces of paper presents the facsimile of a saddle-formed reef. If the right side or cut is flatter, or underlies faster than the left, then the leg on that side will be thicker and longer than the opposite one, or vice versa. On the Hustler's and Garden Gully the anticlinals in the strata in certain places which I have mentioned have a tendency to lean over to the west, and, where not modified by faults or slides, the eastern (or flat) legs are the most persistent and important. Take 2 or 3 in. in thickness of thin paper and corrugate it closely the paper sheets will be found to lie closest together just above and below a horizontal line drawn through the centre of the corrugations, showing that there exists the greatest pressure, and so it is for the most part in the strata. The strata, as I have previously mentioned, in this gold field consists of alternating beds of slate and sandstone, the composition of which differ very much. The slate consists mainly of minute particles of silica (quartz), mica, with clay (alumina), oxide of iron, magnesia, soda, and lime, and the sandstone, of course, and fine grains of quartz, mica, and more or less clay. Not only do these beds of sandstone and slate differ much in composition from each other; but each particular bed of sandstone and of slate differs from the next above or below it. And not only do beds of sandstone differ from each other, but each sandstone bed differs in constitution within itself, or, in other words, no two parts of any stratum are constituted precisely alike. The sand grains vary in coarseness or fineness, and the amount of clay increases or decreases. Each particular bed is constantly increasing or decreasing in thickness, and this circumstance also has to be taken into consideration when we contemplate the corrugation of unequal strata and its results. If unequal substances are bent the effects will be unequal, some will yield to the force, the atoms of which they are formed changing position, the flat atoms arranging themselves in accordance with the curves of the strata, whilst other substances not being formed of such accommodating constituents will crack across the apex or top of the bend as often as the strain overpowers its resistance, and others again will splinter, split, or divide lengthways along the bedding planes. The strain in the strata has been greatest in the anticlinals and synclinals, and in the former they most frequently yielded, because there the least resistance existed in consequence of the proximity of the overlying surface or atmosphere. Now, where the pressure was resisted, such as in the horizontal centres of corrugations, and in synclinals we rarely find quartz reefs unless accompanied by fracture lines or dislocations. As the strata differ in constitution and thickness, they would when cooling contract unequally, and in so doing separate more or less from each other in places in accordance with the amount of diversity between them. The effect of contraction of the corrugated strata in the anticlinals is illustrated by the paper cut in the form of a saddle-reef, before referred to, but these arched parting spaces between the strata were also partly due to corrugation and unequal slipping of strata over or under one another, as manifested in striated faces. I have just been directing attention to the effects of contraction in the thicknesses of strata; but by far the greatest results from contraction of the strata would be manifested in the vertical and horizontal lengths of the sandstones and slates. Here in place of a few feet in thickness we have thousands of feet in continuation of the strata to yield to the same contracting influences. The effects, however, in these thousands of feet are split up or divided by the occurrence of natural joints or divisions in the strata. These joints may be observed in the walls of reefs, in open cuttings on reefs, or stockwork veins, dividing up the sandstones and slates into large or small blocks. The joints running nearly horizontal have a slight dip usually in the same direction as that of the reef, and may be accepted as a hint to the dip of the reef where the exploration is not extensive. As the nearly vertical joints generally make about the same angles with the horizontal ones in sandstone, where the latter joint lines are absent, these give the hint nearly as well. The same remarks apply to slate, but the angles made by the joints in slate more nearly approach those of the rhomboid than those of sandstone, which are more rectangular. The joints in the sandstones are larger than those in the slates, and they often yield large quantities of water, sometimes forced with considerable pressure into cross-cuts, drives, and shafts.

Branch Veins.—These joint lines appear to have originated in many cases the branching quartz veins which make off from reefs into one or both walls. The horizontal joints and branch veins have similar dips to the north or south as have the reefs, showing a general uniformity in the dips of the strata, reefs, and branch veins, and that the reefs and veins have formed in accordance with those laws of Nature which govern the changes that take place in strata. The vertical joints and branch veins usually indicate the dip of the reefs or shoots of quartz; in the reverse way thus, if the vertical branch vein underlies south then the shoot of quartz in the reef dips north or vice versa. Such phenomena as I have just described relates to reefs and strata that have not been fractured or much distorted. It is not to be expected that such uniformity will be found to reign where the strata have been broken and dislocated; in these disturbed regions there appears to be an absence of law in the formation of reefs and veins; but appearances are deceptive and a patient investigation will prove that what at first appeared to be a region of confusion can really be reconciled into law and order.

Shoots of Quartz, of Gold Rolls, and Striations.—The direction of a shoot is usually spoken of as the dip of the reef to the north or the south in the line of the strike. As the shoot of gold generally conforms with the shoot of quartz, it is very desirable that every indication in the strata, or in the reefs, or branch veins that will aid the miner in quickly deciding in what direction the latter dips should be known. Such knowledge will greatly aid the economic management of mining operations, and conduce to the successful or remunerative outlay of capital in mines. I have observed that if the reef distinctly increases or decreases in width and abruptly that the direction of this "roll," or bench, as it dips to the north or south conforms to the dip of the shoot of quartz. I have also noticed that the shoot of quartz is invariably at nearly right angles to the lines of striation in a reef. These striated lines may be observed in the walls of reefs or in the laminations of reefs. In the latter case it is not uncommon to find the quartz divided over considerable areas into thin laminae—often not thicker than a sheet of blotting paper—and the grooved lines are perfectly parallel and exquisitely planed, but though smooth they are not polished. Each of the three great master lodes or reefs of the Bendigo gold field contain these striated faces, and not in one or two places only, but in nearly every portion of them. In certain parts of each reef they are more noticeable or more strongly marked than in others; but in very nearly every part they are to be found if looked for by anyone accustomed to such observations underground. Although I have only just mentioned the three great reefs as containing them, striated faces are by no means confined to these reefs on Bendigo, for I have found them equally well marked in outside or parallel reefs. But I am confining my remarks to these great lodes on Bendigo as far as possible. On other gold fields striated faces also occur, and I shall not doubt often refer to them again. In a mine on the northern extension of the Hustler's line of reef there occurs a reef which for a considerable length was formed of corrugated laminated quartz having much the character of sheets of corrugated iron laid one upon another, groove in groove, only the material being different. The quartz separated or divided with the laminae, but in small corrugated pieces, just as very brittle corrugated iron might be supposed to do. The surfaces of the corrugations of quartz were striated, and the corrugations were nearly as well defined as those in the ordinary sheets of

iron, and of about the same size. These corrugations or flutings had an underlie to the south, and the dips of the shoots of quartz, where the reef increased in thickness, was northerly at nearly right angles to the flutings. I might mention this reef was named the Williamson's, and was situated in one of the claims owned by the Iron Bark Quartz Mining Company—the first large public company on Bendigo—and of which I was the general manager. In assisting my brother, who was the first mining surveyor on Bendigo, I had opportunities of visiting and examining all the claims on the gold field, so that my early experiences of mining (at shallow depths) the auriferous reefs on this gold field were unusually extensive. I did not profit as much as I should have done with my opportunities; but I was young, quartz mining was younger, the excitement of gold finding and spending was rife, study was at a discount. I was supposed to have a slate loose because I chose to bestow a good bit of time in examining the mullock or waste heaps for fossils and minerals. In those times quartz reefs were said by the great majority not to be worth working below the water level, or (say) from 30 or 40 ft. in the gullies to 150 ft. below the surface of the hills; and, in fact, many claims were abandoned then which have since yielded from 4 ton and upwards of gold from below the water level. What are and have been the feelings of these claimholders possessing so little faith in the permanence of their reefs or the persistence of them in depth can be better imagined than described. Nearly all those men that did stick to their rich claims of the good old times, through bad and good reputations have become wealthy, and I count many friends amongst them, I am glad to say; but I have no less friendship for the unfortunate or less lucky, one of whom, once very rich, now poor, I had the pleasure of meeting this day.

Melbourne, Sept. 4.

WM. NICHOLAS, F.G.S.
Consulting Mining Engineer.

THE DIAMOND FIELDS OF SOUTH AFRICA.

SIR.—As the British public are so frequently appealed to for capital for the purpose of developing the innumerable Eldorados of this country they are entitled occasionally to know the truth relative to the investments into which they may have dropped their coin. I shall not refer to the shooting and robbing of blacks, as that is an industry confined entirely to the Transvaal Dutch, and is too good a thing to be offered to the public. I have so frequently written relative to the disasters of the Kimberley Mine, and the wooden-headed policy of the Mining Board, that a repetition seems almost unnecessary. But I am again reminded of that gigantic failure by a telegram, which was published here on Sept. 11, saying—"Tremendous fall of reef yesterday in Kimberley Mine; Jones's shaft completely destroyed." I have always pointed out in the *Mining Journal* that Jones's shaft was the most silly thing ever introduced by a practical miner, and under the most favourable circumstances it could only serve as a temporary measure.

The non-success of the Kimberley Mining Board loan in the London market has cast a deep gloom over the whole of South Africa. This was looked forward to as the salvation of the country; payments of all kinds were deferred, old debts were lengthened and new debts incurred; corks popped more frequently in the canteens, and a few tried to discount the portion of the 500,000, which would fall to their share. But how are the mighty fallen? Although the Standard Bank undertook to float the loan of 500,000, it is said only 27,000, was subscribed; and on this becoming known the Chairman, with his usual verbosity, recommended them to go to allotment, for the purpose of getting a quotation on the Stock Exchange. It requires a "Mark Twain" to do full justice to the innocence of those financiers.

Small pox is disappearing from Kimberley, but I regret to say it has broken out here, and already there are 23 cases.

I have no doubt the English papers will be inundated with letters from various correspondents condemning the wicked English Government for deserting the poor blacks, but I will not refer to this matter other than to say that in addition to maligning Mr. Gladstone desperate efforts are being made to introduce a British army and its funds. There may be a few dissentients as to the army, but all are agreed as to the funds. Even the Dutch are not averse to borrowing John Bull's money, although they would try to shoot him as soon as they had borrowed enough to purchase the necessary ammunition. One thing seems certain; if money cannot be borrowed to carry on the mines a large portion of the diamond mining industry must come to grief. A great deal has been said and written about private individuals making the ground pay, after the best conducted companies fail to do so; but this is all humbug. For example—I have known several cases where thoroughly honest and competent managers have broken and washed from 700 to 800 loads per day, and their companies have had to go into liquidation, in consequence of the unproductive character of the stuff. Private individuals have then leased the ground, and by swaggering about in canteens, and the merest pretence of working they pretend they are making it pay; the fact is, it is a mere cover to enable them to traffic in stolen diamonds.

It is generally considered that, notwithstanding the big salaries paid to trappers (black and white), there is more illicit diamond dealing now than at any time since the diamonds were first discovered. The Kimberley papers say—"Everybody from the lowest to the highest and from Cape Town to Pretoria deals in stolen diamonds," and as far as appearances go they are correct. I am certainly convinced in my own mind that those who talk most about the matter and make the greatest fuss are the chief centres of the damnable traffic, and only do so to divert suspicion. It is my opinion that very few of the real culprits are ever caught, and that 50 per cent. of the convictions take place on the unsupported testimony of those sable instruments who have no idea of the nature of an oath, and who are ready to swear anything for a bottle of grog or a good feed. A commission has been sitting here lately to enquire into certain irregularities in connection with the working of the mine, and from the evidence it appears that a certain Jumbo and his satellites have been doing all in their power to annoy the English companies.

At present the Jagersfontein Mine is not worth a farthing. A great many persons have been holding ground, hoping that if the English companies turned out payable they would be able to sell, but there is no chance of that, as the English companies (supposed to be) working here are, in my opinion, a disgrace to mining. It is true that diamonds are occasionally found, and of good quality, but every 12 sterling worth of diamonds found costs 50l.

Why the English companies fritter away their money as they do here is a perfect mystery to everybody. I remember reading the report of the last annual meeting of one company, at which the Chairman said that one of the directors had gone out to the mine to do the necessary, &c. One of the directors did arrive at Kimberley, and from there he telegraphed to the manager—"If you have no diamondiferous soil to work reduce your staff to its utmost limit." This was just at the very moment that the Chairman was doing his best to cheer the disconsolate shareholders. Last January the same director instructed the manager to stop all work at once, unless they were in pure diamond soil. They are not in pure diamond soil, and I hear the manager estimates that it will cost from 40,000l. to 50,000l. to remove the floating reef before he can form any idea of the value of the claims. It seems the manager is continually urging the company to work or wind-up, but he gets no reply to his letters, and some months ago, in utter disgust, he sent home his resignation, which I hear the Board would not accept. I have never spoken to the Central manager since he has been here, but judging from appearances he seems to be a very energetic and trustworthy person, and it is only fair to say he is everywhere spoken of as a thoroughly efficient and straightforward man, whose estimates are thoroughly to be relied on. I have seldom seen a greater fiasco than the Jagersfontein Mine. I have held an interest in different parts of the mine for years, and I am fully satisfied it is no place for British capital. The London and Jagersfontein Company is in liquidation. They have 50 claims, two steam-hauling gears complete, a very good disintegrating machine, a great length of tramroad, several houses, stores, and steam-pumps; and the manager values the whole at about 3000l. I would not have the claims as a gift, and I doubt if everything be put to the hammer whether they will get a bid. The manager of this company is also a good man, and if it were possible to have made the concern pay he would have done so.

Magnificent reports continue to arrive here from the gold fields,

but the returned diggers with whom I have conversed do not speak very highly of the place, and say that up to the present only a very few places have been discovered which are likely to pay. An old Australian prospector who has just returned believes the centre of the Transvaal will be found to be richer, and more like the Australian deposits than anything yet opened. He intends returning, but says it is no use any person going there without a well-lined purse.

If small pox continues here provisions will be at famine prices, as the Dutch will not bring in their produce, and there being no grass in the neighbourhood we shall all have to skedaddle. Although I have not made the acquaintance of the various managers of the companies I vouch for the truth of all I write.

EXPERTUS.

Jagersfontein, Sept. 21.

THE LITERATURE OF MINING.—No. IV.

SIR.—It evidently appears that there is a latitude accorded to mining literature that does not really belong to the literature of mining—between that which emanates from and insuperably appertains to it, and that which is substituted, appended, and applied for personal or other purposes foreign to and inimical of its best interests. There is here a distinction, but one certainly not without a difference—the difference being between that which inherently belongs to it as a system, promotive of its interests, and those crude and crudely applied adjuncts fraught with deception and fraudulent tendencies.

If all that is written of mines and mining is embraced in and constitutes its literature, this much may safely be said of it that outside of its statistics it contains no prominently recognised systematised code, whereof almost every man is a law unto himself, and every pretender an oracle—a would-be and too-frequently accepted authority. The question is how is it to be freed from such contaminating associations, which not only deform but corrupt its channels. There can be but one answer to this—its current literature is derived from its practical exemplifications, and as is the one so must the other be—one is the thing itself, the other is its intelligible expression—that by which it becomes known and accredited. That the contaminating associations which corrupt and defile the literature of mining arises from the arbitrary manner of its conduct has been long and sufficiently known, not by all interested but by very many, powerless to correct such abuses. It is not the product of an individual but of a class of individuals from one class of motives. Ignorance may, in many instances, be motiveless other than that of desire to pass for what it is not, actuated by a presumption of the ignorance of others, but so much cannot be said of nefarious design, although it is actuated by a similar presumption in regard to others, increasing in boldness, dexterity, and momentum in proportion as it succeeds. That ignorance is blis is true in more than one sense, and in its application to more than one set of individuals, but the folly of being wise in not so apparent, especially in respect of that arrogated which centres in self. Self sufficiency, self importance, and self satisfaction. Men who are bound up therein, and those that are amenable to conviction from external influences, subject to the approbation of reason and judgment, are persons of a very different mould and type.

In reverting to natural phenomena the mind to be enlightened thereby must be free of bias from pre-conceived notions, subjectively impressive of its objects and receptive of its imagery through the medium of sense. The economy of Nature is susceptible of interchange—mind with mind, matter with matter, and matter with mind; mind is inquisitive, matter is responsive. Is matter then sentient, it may be asked; is it not inert, dead? It is not dead or inert, but susceptible of intrinsic involuntary motion, which is the symbol of its life and activity. Motion relative to external objects there may not be, independent of the application of external force, but molecular motion, the essence of its being, there is and ever will be.

But what, it may be asked, has all this to do with the literature of mining? As much, I reply, as any and everything has to do which relates to the beginning, progress, and perfection of every natural product, as much as the nature and constitution of the soil has to do with the life, growth, and substance of the plant, the origin of which substance was in the soil, the vital principle conducing to organised ocular existence was contained in the germ within the seed, which also again was contained in the soil, but previously, from whence the seed, and whence the germ, and whence the vital principle enshrouded. That the seed was antecedent to the reign of law is inadmissible, and cannot be entertained; but that the vital principle was antecedent is also beyond the region of doubt, beyond which it has been said chaos reigned, lawless. But what of chaos? Can such a state of being be imagined, of wildest confusion, in which law—or effective design, which amounts to the same thing—was not the directing and controlling energy. If so the subsidence of chaos gave birth to law, and hence its origin, order reduced from confusion, unaided by any external energy or design superior to its own. If this be so Nature must be approved its own architect, and chaos its own progenitor, and here we find ourselves face to face with transcendentalism. It cannot be otherwise to trace the connection between effects and their causes inevitably lead to it—as so long as there is a recognised connection between effects and their causes so long will there be necessity for, and respect due to, physical phenomena and speculations concerning the origin of things, not excepting mind and matter themselves, whilst the annals and literature of mining may consistently embrace hypothetical conclusions so well founded, and so naturally arrived at, not only with no loss of prestige, but with positive advantage.

ROBT. KNAPP.

Long, Nye County, Nevada, Oct. 2.

GOLD COAST MINING COMPANY.

SIR.—No reply having been given to my letter concerning this company I am induced to give as much publicity as possible, partly in order to rouse an interest in the minds of the other shareholders, and to give them a just perception of legitimate mining. I would also hope that the directorate in London will not be slow to remedy the wrong which I have no doubt exists in managing and working this mine, but in order to go carefully into it it will be necessary to look at the prospectus, the statutory meetings, the reports as issued, the knowledge we possess of the officials connected with the immediate working of the mine, the chances of the shareholders, and the means by which it can be brought to yield dividends. The prospectus states that "the firm of F. and A. Swanzy, merchants on the Gold Coast, and in London, state that gold dust to the value of upwards of 1,000,000l. sterling has passed their hands from this neighbourhood alone under the primitive mode of barter still practised by the natives." This it appears induced the firm in 1877, or four years previously to asking the present shareholders to co-operate with them. They employed an engineer, and through his advice secured the estates and transferred them to the present company.

The property is said to comprise 1800 acres of land, held under two long leases for terms of 77 and 99 years, for which Messrs. F. and A. Swanzy hold themselves responsible for the ground rent. At Crocker's the vendors state they have erected three engines, 12 heads of stamps, steam-pump, saw frame, saw bench, tramway rails, wagons, tools, materials, and other mining equipment. This was offered by the mercantile company, reserving to themselves as large an interest as possible to get the co-operation of shareholders to make it a good mining undertaking, asserting as a reason the superior position of this company when compared with an enterprise which has to face the immense expense and delay of having to provide its buildings and machinery, as well as to organise its staff.

There are said to be two valuable reefs, which run through the property, one at Crocker's reef, 4 to 5 ft. thick, and appears to run through the greater portion of the property. Two shafts have been sunk on this reef to a depth of 70 or 80 ft., and its value as an auriferous vein has been established beyond doubt. A bulk sample from this reef, assayed by Messrs. Johnson, Matthey, and Co., gave a result of 3 ozs. 7½ dwts. to the ton of ore. The other reef running in a parallel direction is 4 to 20 ft. thick, and being nearer the river it can be worked with less expense. A very rich quartz had been discovered in the course of sinking. It was intended to open up Crocker's reef, but as the present pump proved insufficient, and rich lodes of alluvial deposits had been found which could be more easily worked, the operations on this reef were suspended, shafts were then sunk on the Aja Bipa lode, three in number. South shaft to

the depth of 45 ft.; centre ditto, 36 ft.; north, 45 ft.; with this result that 50 tons of ore fairly taken and crushed produced 41 ozs. of gold of standard quality, and 11 tons of sand from the strakes, which assayed by Johnson, Matthey, and Co., report 5.6250 to the ton; the whole being equal to over 2 ozs. of gold per ton of ore crushed. This lode is ascertained to be from 22½ to 30 in. thick, and it is estimated that the company will have over 2700 running feet to work upon, and to a considerable depth before reaching the water level. Facilities for working the mine are said to be the following:—Plenty of timber, natural streams, conveniently situated for reduction purposes, run through the estate, and native labour is readily procurable at low rates. The directors assert they, therefore, feel convinced that with but little further outlay and management these mines are capable of yielding large returns.

From special report of Commander Cameron, R.N., who states at Aja Bipa Mine that it is not at all unlikely that garnets or other gems may be found. One or two mineral crystals showed a green colour, which he thought might be tourmaline or emerald. He further states that over the rock which forms the main body of the hill lies the usual red clay and oxidised quartz gravel, which if treated by hydraulic mining, ought, as it contains gold, to prove a paying stuff, and washing off the surface dirt would lay bare the rock, and render all after work easy and simple. The alluvials from the bottoms should here prove unusually rich, and means might be adopted by which they should be raised mechanically and flamed down again. Ample water supply exists both for hydraulic mining and reef working. From an extract from a letter I find on one occasion a certificate was given by Mr. Edward T. McCarthy, mining engineer, R.S.M., to Mr. Crocker, from whom he received a sample from Crocker's Reef, which when assayed yielded 5 ozs. of gold to the ton of stuff. Mr. F. Symons (May 11, 1882) states that with 12 heads of stamps the yield he estimates as thus:—300 days at 10 tons, equalling 3000 producing 1 per ton, yielding 3000 ozs., at 3½ 12s. per ounce, equalling 12,800; cost of 3000 tons at 1½ 2s. 7d. per ton, 3387½ 10s.; profit, 7412½, while Mr. Crocker states the cost of working will probably be less than the above statement. Now let us see what all this means.

The property without a doubt is immensely rich. The mines at the time of handing over were said to be sufficiently developed to be within an easy reach of paying enormous dividends with very little additional outlay and management. The average yield of gold was estimated at 2 ozs. per ton of quartz. [Mr. F. Symons two and a-half years ago gave his estimate at 10 tons per day for 12 heads of stamps. There are said to be 36 heads of fire stamps from the beginning of 1884, and the result of crushing has not been 10 tons per day. Hydraulic mining has not been thought of as suggested to assist in increasing the yield of gold at the mines (while F) in the Memorandum of Association has not been mentioned since the company has been in operation.—*Helston, Oct. 21.* N. R. H.]

DYNAMITE.

SIR,—The readers of the *Mining Journal* may not be aware that a determined attempt is being made by the Home Office Inspectors to impose some new costly and useless regulations affecting the storage and keeping of explosives. The subjoined article, published in the *Glasgow Herald* of Tuesday, sets forth the proposed state of affairs very clearly, and I should be glad if you could find space to reproduce it. Should these regulations be allowed to become law the price of dynamite and cost of keeping it will be enormously increased immediately. I hope to be able to write you more fully on this subject next week. In the meantime I hope every one interested in British mining will consider whether it would not be advisable to join in some determined opposition to these absurd proposals.

Moorgate-street, Oct. 23.

J. T.

"The attention of the public was recently drawn to the statement that the Home Office meditated issuing an Order in Council requiring 11 owners of magazines and stores for containing explosives throughout the country to be watched night and day. This order, although it has not yet been officially promulgated, has, we understand, been unofficially intimated to many of those concerned. The question is one which, in our opinion, merits the gravest consideration in the public interest; and, therefore, any step which will materially alter the *status quo* must be very carefully examined into. When we state that there are scattered throughout the United Kingdom about 2400 of these magazines and stores, and about 20,000 registered premises for the storage of explosives, it will readily be seen that the due regulation of these is a matter of paramount importance. There is to be considered, primarily, the public safety, and next the commercial interests of the kingdom. In respect of the first, we have the most elaborate rules laid down by Government, which must be complied with to the satisfaction of her Majesty's local authorities' Inspectors, who periodically visit these buildings. In view of this new proposal, we have to consider whether the rules referred to are insufficient for the purposes required, and, if so, what effect the imposition of more stringent laws will have upon an important industry. To begin with, we may take it as a foregone conclusion that we cannot now afford to abandon the use of the most powerful explosives, without which the cost of constructing our railways and other public works would be immensely increased. The prices of coal and iron would be considerably raised, and the enhanced cost of these articles would, in their turn, compel shipbuilders and all users of iron and steel to quote higher rates, with the probability of seriously injuring these industries. We have promised that the proposed regulation would have the effect of greatly curtailing this trade in explosives, besides materially increasing the cost to the consumer, and this conclusion will be more evident when the pecuniary effect alone is looked at.

"There are, in round numbers, about 2400 buildings which would require to be watched night and day, and, taking the outlay at 2½ per week for each, we have at once to deal with an expenditure of upwards of 240,000£ per annum. But if a store containing 300 lbs. explosives, under License A, requires to be watched, it would be scarcely equitable, or even judicious, to allow premises registered for 100 lbs. or 200 lbs. to escape the provisions of the regulation. If that were done there would be about 22,000 magazines, stores, and registered premises to be watched, at a total cost of about 2,000,000£ sterling per annum. This outlay would fall very heavily upon those dealing in explosives, thus necessitating a rise in prices to most probably prohibitory rates. This would more than likely apply with greatest force to the more powerful explosives, such as dynamite. We are thus face to face with very unpleasant alternatives. Either we must disregard what the Home Secretary considers the insufficiently guarded safety of the public, or, on the other hand, risk the probable disorganisation of some of the leading branches of trade. It is impossible to pass over lightly either of these considerations, and the question is how to attain the greatest security with the least possible disturbance to the common weal. In the first place our inquiries should be directed to the alleged danger. It is an undoubted fact that outrages of a most serious and alarming nature have been committed, and no doubt the natural inference will be that the legitimate manufacture of explosives is in some way concerned, in so far as the explosives wherewith to perpetrate the outrages may have been stolen from magazines, &c. So far, however, as the facts of such criminal acts have been made public, it has been shown that the explosives used have been either clandestinely introduced into this country or surreptitiously manufactured within the United Kingdom. None of the outrages are known to have been caused by the use of legitimately manufactured or imported explosives; therefore, while the Home Office is bound to take all due precautions, it would be highly injudicious to give way to panic, and thereby harass commercial interests of such widespread influence as we have but barely pointed at.

"It does not appear that the danger lies in the existence of these magazines, stores, and registered premises, so much as in the disturbing elements of society, which, unfortunately, presently exist in our midst. One of the strongest protections we possess against such ruffians is the fact that while they use explosives to commit wanton murder and destruction of property they are as frightened for the terrible agents they employ as the public are dismayed at the knowledge of such dastards being at large to carry out their infamous plots. It is abundantly evident that the explosives used have been

timidity, maladroitness handled for the most part, and display but a meagre knowledge of how to develop the dangerous energy of those powerful engines of destruction. There is danger unquestionably, and serious danger, but there is a right and a wrong way to grapple with it. It seems to us that if the present safeguards are deemed insufficient for the public safety the most effectual way to remedy such a state of matters is for Government to take over all these magazines and stores into their own hands, and place the same under police control, renting such buildings to legitimate traders at a reasonable rate. This might be done either in whole or in part, taking the more dangerously situated stores over at once. It is absurd to suppose that a watchman could prevent a band of determined men from breaking into any magazine and stealing its contents; and, furthermore, it is not to be imagined that private firms will take efficient means to protect the public. They will protect their own property as well as may be, but the public safety must be undertaken by the State, and this will have to be done sooner or later, and much better sooner than later."

THE RAISING OF MINERALS FROM THE MINES TO THE SURFACE.

SIR,—In the present condition of mining generally economy in every department is of urgent importance, but less attention appears to be paid to the raising of the minerals from the bottom to the surface than to most other branches of it. It is very different on the Continent, where the greatest attention is paid by the engineers to the underground as well as to the other kinds of haulage, and something we believe would be gained were we to take a hint or two from our neighbours on the French side of the Channel. There is, for instance, an excellent arrangement at many places for letting the men down and drawing them up, which should commend itself to our mineowners. It is the adoption of what are termed parachutes, or safety cages; when the men are about to descend the ordinary cages are detached, and the safety ones take their place, and this is repeated when the men have to be drawn up. The changing of the cages only occupies from three to four minutes. At the Anzin Mines the drawing machinery is most complete, and at one shaft, 495 yards deep, the cages are raised from that depth in the course of 40 seconds, without any counterbalance except what is obtained from flat hemp ropes. At most of our coal mines, from which large quantities of mineral are drawn, there are single-decked cages, but it is very different in both France and Belgium. At one place where there are two working levels, one being 600 yards from the surface, the engines for winding are kept actuated by means of flat hemp ropes, and arrangements are made at the bottom for the loading and unloading of several tubs at a time. At one of the pits there are four decks, all discharged together at the bottom. At the surface the decks of the upper cages are brought opposite to one landing, whilst the bottom cage remains at rest. Several of the tubs are loaded at the same time, the platforms or stages communicating with each other by short counterbalance inclines.

Again, in some other districts, coal is worked by overhead stoping, as is the case in the working of metalliferous mines, the face consisting of a series of steps, each about 6 ft. in height, and one of these is the working place for a miner. At the bottom of the face there is a level by which the coals descend through spouts, called chimneys, consisting of small vertical openings timbered through the goaf with poles having a sluice at the other end. The coal is put into the nearest chimney by the miner, underneath which are tubs, which are loaded by bringing them below the spout and then removing the sluice, when the coal goes direct into the tub. At the Marienot and other pits at Bascoup, in Belgium, the underground haulage by means of the endless chain has been brought to a high state of perfection, and such as could be followed with advantage in this country. In one instance, at least, we are told that the entire system is self-acting, and this to the extent that the tubs are run from the furthest part of the workings to the bottom of the shafts without any expenditure of the engine power. The seams are on the rise, so that sufficient power is obtained to drive the chains along the levels. A most interesting system has been adopted at one of the mines in Silesia, which appears to be worthy of special notice. In the conveyance underground the coal is put into cars holding from 2 to 3 tons, which are carried along by means of small locomotive engines; and, as the cages take up two of the cars, as much as 6 tons can be taken up at one drawing. As the seams of coal are very thick—one being equal to the South Staffordshire Ten-yard bed—it will be seen that by such a system a vast tonnage can be drawn daily and at a comparatively moderate cost. This is very different to what is done at so many of our large mines, where only 2 tubs, each with 10 cwt., are drawn up at a time. From these few facts it will be evident that our mineowners are not so far advanced in the economical systems of raising minerals as is generally believed, and that in this respect they might gain some little information to their advantage by visiting some of the mines abroad and seeing how they are worked.

Barnsley, Oct. 21.

MINERAL PROGRESS IN SOUTH AUSTRALIA.

The annual report of the Government Geologist of this colony states that at Echunga gold has been obtained in pliocene drifts and alluvial gullies, and in quartz reefs and mullocky leaders. In the latter it has been found in patches, but no large amount of payable stone has, up to the present, been discovered in any vein. It is thought, however, that richer specimens than have yet been obtained are to be found, from the fact that recently a patch of 30 ozs. was discovered at a few feet from the surface, and that many of the reefs and leaders contain a little gold. A shaft, 300 ft. in depth, has been sunk on auriferous quartz reefs at Bird-in-Hand Mine, Woodside. The Ridge and the Two-in-the-Bush Mines have also been vigorously developed. At Mount Charles, Oakbank, Blamberg, Mount Pleasant, Barossa, and other places in the same district gold has been worked in alluvial deposits and in veins, and some of the specimens of quartz gold found were very rich. At Waukaringa very little has been done, except in one or two cases, to develop the mines. Near Mount Victoria gold has been found in connection with a copper lode. Some gold from quartz has been obtained at the Woman in White and Boolcoomatta Mines. Uooloo and Yudanamatana districts have been worked for alluvial deposits. At a copper mine at Nichol's Knob a sample of gossan yielded on assay 3 dwts. 6 grs. of gold to the ton. There are three great drawbacks to gold mining in this colony—the scarcity of water, the inaccessibility of land through its being alienated from the Crown, and the remoteness of some of the localities from civilised life. Areas of copper are extensively distributed in lodes wherever the metamorphic and palaeozoic rocks occur. The mines in the colony being worked at the present time are—Hamley, Moonta, Wallaroo, Blinman, and Victoria. At Moonta the deepest shaft is 1320 ft.; at Wallaroo, 1020 ft.

The amount of copper exported in 1882 was 3647 tons, valued at 259,884£; copper ore 1294 tons, valued at 105,686£. Lead ore, galena, and cerussite have been found in numerous places. The amount of silver associated is usually small, but it is likely that similar silver-bearing lodes to that at Thackaringa will be found in the metamorphic strata extending across the border of this colony. Kangarilla, Avondale, near Farina, Mount Serle, and Waukaringa are comparatively new localities. Bismuth ores are found at Balhannah, Daly, and Stanley Mines, and in connection with auriferous veins at Woodside. Ulanite, a mineral containing antimony and nickel, occurs at Gill's Bluff, near Mount Lyndhurst. Cobalt is found associated with manganese and iron ores at Cartope, Barra district, and the iron mine. The percentage of cobalt is from a trace to 3.66. Rutile occurs at Echunga and near Onatara Water and in the North-East. Pyrolusite is found near Cold and Wet Station in the South-East, Barra, and near Gordon. Psilomelane at Sleaford Bay, Port Lincoln, and near Gordon. Lode and stream tin occurs at Mount Wells, Northern Territory. Plumbago has been found at Mount Charles, near Woodside, and at Port Lincoln. At the former place it contains 10 per cent. carbon; at the latter, 50 per cent.

The following is an alphabetical list of the minerals occurring in the colony:—Actinolite, agate, albite, allophane, almandine, amphibole, anglesite, ankerite, apatite, aquamarine, aragonite, arsenopyrite, asbestos, atacamite, angite, azurite, barite, beryl, biotite, bismuth, bismuthimite, bismutite, bog iron ore, bornite, breunnerite,

cacholong, calcite, carnelian, cassiterite, celestite, cerussite, chalcocite, chalcodolite, chalcotrichite, chlorite, chrysocolla, chrysolite, cinnamon stone, cobaltite, coccolite, copper (native), corundum, crocidolite, cuprite, cyanite, diamond, diallogan, diopside, dolomite, epidote, erythrite, felspar, fibrolite, flint, fluorite, galena, garnet, gawlerite, gillinite, girasol, glauconite, gold pyrites, gold, grammatite, gypsum, graphite, hematite, halite, halloysite, hornstone, heliotrope, hyalite, hyalosiderite, hydrophane, Iceland spar, ilmenite, iron, jasper, kaolinite, kalinite, lapis-lazuli, lignite, limonite, lydon-stone, magnesite magnetite, malachite, malaccolite, manegese ore, marble, mica, mirabilite, molybdenite, muscovite, nephrite, nitre, olivine, orphante, opal, orthoclase, pearl spar, pennimite, phosgenite, pistomesite, plasma, prehnite, psilomelane, pyrite, pyrosulite, pyromorphite, pyrope, pyroscene, quartz, rhodochrosite, rock-silk, rubellite, rutile, satin spar, selenite, side rita, silicious sinter, silver, soapstone, sphalerite, sphene, steatite, stilpnomelane, sulphur, talc, tin pyrites, titanic iron, touchstone, tourmaline, tremolite, ulmanite, vivianite, wavelite, and wolframite.

In order to encourage the development of the mining industry in the colony the following resolution was to be moved in the Assembly by Mr. Johnson, but the result of the discussion has not come to hand yet:—"That with a view to encourage legitimate mining in South Australia the Government be requested to place on the Estimates a certain sum for the development of a payable gold-bearing reef at a depth of not less than 500 ft., and also for the discovery of payable gold at greater depths; that bonuses be also offered for the discovery of payable alluvial gold fields, and to the finder of payable silver lodes within the boundary of this province."

THE FIRST SILVER SMELTING WORKS IN AUSTRALIA—A RIVAL TO SILVERTON—No. II.

THE IMPORTANCE OF ASSAYING CANNOT BE OVER ESTIMATED. The management of this mine has fully realised its importance, and may be congratulated on the extent to which assaying is carried out in the hands of a thoroughly competent assayer. The laboratory has been brought to such a state of perfection that the value of different ores taken from different parts of the mine, the bullion after the ores have been smelted, and the slag remains, are known to the nearest possible accuracy. Every part of the mine where the silver lode has been uncovered has been assayed, the positions from which the ore for that purpose was taken and its richness in bullion being marked and duly recorded. In assaying ore a very small quantity is taken from a large pile indiscriminately, after it has been broken up and turned over several times. Silver being more equally distributed than gold, the accuracy of assaying as indicating its general value, can be relied on to a much greater extent. In the large quantities of ore sent to England for treatment the correctness of the assays previously made was abundantly manifested. At this mine before the ore is broken it has undergone an assay at least as a test of its general value. Before being placed in the furnace another assay is made. Each block of bullion is also assayed to prove what percentage of silver and lead it contains. All this is done to show the value of everything. Pending the erection of the larger works, with the means of cupellation attached, the laboratory, in addition to having the appearance of a chemist and druggist's establishment by the number of bottles containing chemicals, is fitted up with small furnaces. In making assays by these the silver is extracted from lead and lead from ore in exactly the same way, though of course on an infinitesimal scale as by cupellation, and smelting with silver from lead after going through process after process impossible to describe, both metals are placed in very miniature bone, ash, cupels, or cups. These are then put into a furnace of great heat, when upon the lead is absorbed in the cupels, and the pure unalloyed silver remains behind in little globules. The silver and lead show the result of the assay, and in exactly the same way on a large scale will the cupelating or refining process be conducted. The assayer of the company is Mr. J. Macavie Smith, who has been residing at the mine for some months, and who besides making sometimes from 20 to 30 assays a day, combines the duties of assayer with those of superintendent of works.

THE MINE AND ITS PROSPECTS.

Situated on a mountain range over 4000 ft. above the sea level about two miles from Mitchell's Creek, an old and now almost deserted surface-scratching gold field, and about 15 miles from Rydal, stands the Sunny Corner Mine. After a personal and thorough inspection of its mines and levels and extensive workings, with its well-defined inexhaustible gold, silver, and silver and lead lodes, we pronounce it a magnificent property. It has an eventful history. During the past 20 years, when the ground was first taken up, considerable quantities of gold were obtained about the surface, and an attempt was made to follow the quartz reef to any depth. Silver mining was unthought of, and it is doubtful if the existence of a silver lode was known. Eventually a crushing-machine of 10 stamps was erected on the ground, by which it is estimated that Messrs. Winters and Morgan obtained 30,000£ worth of gold from the mine. Some four or five years ago the forfeiture of the lease was published in the Government Gazette, and it was immediately taken up by the present general manager, W. F. Hurley and others, who purchased at a valuation the machinery and working appliances. Not long ago it was formed into a company of 64,000 shares, of which company Mr. Gresly Lukin is the legal manager. The great value of the silver lodes having been demonstrated by assaying, as well as by the returns from ore treated in England, an attempt has been made to jump the mine, and now we are given to understand that a claim has been made on behalf of the original owners for that portion of the tailings on the mine at the time it was declared forfeited. Pending the hearing and settlement of these disputes an injunction has been obtained from the Supreme Court making the presence of trespassers unlawful, an order which has been printed, and the placards are now numerous posted on the trees, rocks, and other places in the immediate neighbourhood. The lease is about 200 acres in extent, additional sections having been added for smelting and other purposes connected with its working. Underground mining and the surface appliances on the Sunny Corner Mine are carried out on a system only equalled by the famous gold mines of the Sandhurst and Ballarat districts in Victoria. Every preparation has been made to carry on gold and silver mining operations on a scale never attempted in New South Wales. Every possible and practicable means for the saving of unnecessary labour and other economical working has been adopted. The workings commence at the rise of a great range of country, and to save expense of haulage, nearly the whole of the products of the mine are conveyed either to the crushing machine or smelting works through tunnels. The gradient to the new smelting furnaces, estimated about 200 yards from the opening of the tunnel, is sufficient to allow the empty trucks to be pulled up by the descending full ones, large revolving drums being erected at the top of the tramways to regulate the speed. The crushing batteries are fed with quartz in the same way.

Probably there is no mine in Australia that Nature has so richly endowed with different lodes. Here we have, first, a well-defined reef of silver or quartz cropping out at the surface, because of the sudden break in the country, ranging in thickness from 4 to 10 ft., running north and south, and dipping west at the rate of 1 in 6 ft. Immediately beneath that, without any other strata whatever intervening, there follows in exactly the same course and underlies a soft silver lode, differing in thickness, but averaging fully 12 ft. Below that also, without any other intervening strata, is a hard silver and lead lode, in some places 35 ft. in thickness. Operations having been in the main confined to the quartz reef tens of thousands of tons of the other ores remain uncovered, which will greatly facilitate its working. In view of the establishment of smelting-works some thousands of tons of each of the silver ores have been broken, and are now stacked all over the mine awaiting treatment. It will be disposed of at the rate of 90 tons a day when the two furnaces are at work. It may be here stated that large dividends would have been realised from the quartz lode were it not for the breaking down of immense bodies of silver ore. Here and there throughout the mine shafts for the conveyance of timber and ventilation have been put down from the surface, differing in depth according to the altitude of the range and the depth of the workings. A number of winzes

have also been sunk to test the thickness of the lode, and for communication with the lower levels of workings. Tramways run here and there and everywhere for the transit of ore, and its handling is economised by spouts at convenient distances from the stopes, back, and faces. Unquestionably the manager has got his mine in such a state of preparation as to keep the furnaces at work for many years to come. As the property is one mass of mineral lodes enormous quantities of timber will be required for its safe working, and all that which has been put in to allow the quartz lode to be worked will now have to come away to get at the silver lode beneath. Practical mining, such as is displayed here, will enable this work to be done without danger. Throughout the mine its tunnels, levels, cross-outs, winzes, shafts, stopes, and blocks, you come across the manager's pegs. They are all numbered to correspond with the manager's records, and indicate not only that they are taken from the spot, but reference will reveal the detailed result of the assay, and the quantities of silver, gold, lead, and the baser metals it should yield to the ton. To predict the future prospects of a quartz reef from its bare face is an impossibility, but here we have a mine where the manager knows his rich payable and his poor ores. In some places the assays indicate only a few ounces of silver to the ton, in others over 400. The average yield, according to the assays, will be about 60 ozs. independently of the other metals, gold and lead. Twenty ounces of silver per ton at 4s. an ounce, should pay the whole of the expenses of working and smelting. Lead of the quality produced by these lodes is worth from 15s. to 20s. a ton, and it is now being produced at the rate of about 22 per cent. So far as ascertained, there is little gold in the bullion, but if the returns of silver and lead are as great as anticipated, in other words if the assays made generally accurately foreshadow the yields, the mineral wealth of this mine is simply incalculable. Portions of the soft silver lode are now going through the furnace to the extent of 30 tons a day. It is yielding nearly 60 ozs. of silver, besides the stated percentage of lead in almost exact accordance with the assay previously made. The richer ore-stack behind that at present being heated will be reached and put through the furnace in the course of a few days. There is also on the ground about 20,000 tons of quartz tailings, and their richness in silver, which it was impossible to extract by the crushing process used for saving gold having been proved by 50 samples taken from all parts of the pile, it is intended to put them through the furnace. Quartz crushing is suspended, but is only awaiting the erection of new machinery, in which work the company are also engaged. It is expected that the greater furnace will be ready for active and continuous use in the course of seven or eight weeks.

THE FIELD AND ITS SURROUNDINGS.

Mining excitement has already set in on the Sunny Corner field. The success of the Pacific Smelters, as the furnace is called, is the subject of conversation everywhere for many miles round. Numbers of the farmers of the district have their teams employed in carting coke from Rydal, and limestone from Piper's Flat. The road between Rydal and the field for the greater part of the distance is in a dangerous state, being cut up into deep ruts by the heavy teams constantly passing over it. At present 10 miles of the road is receiving Government attention to the extent of 75s. per year, and we are urgently requested to ask that this might be increased to a reasonable amount. The field is now some miles in size, leases being taken up for 5 miles in length and 3 miles in width. Business sites have been received, and the nucleus of a town already formed on the tableland of the mountain range, about a mile from the Sunny Corner Mine. The lease adjoining the western boundary is the Silver King, in which active work is proceeding. This company, whose manager is Mr. G. Hurley, have struck the silver lode, and the urgent necessity for the erection of additional furnaces is shown by the number of men they had employed on Saturday in filling small canvas bags with ore, to be sent to England for treatment. The operations of the mines surrounding are at present confined to prospecting for one or other of the lodes, the course of which, owing to the mountainous character of the country, is very irregular.

THEORY AND PRACTICE OF ENGINEERING.

The introductory lecture of a course on this subject in connection with the Engineering Department—Yorkshire College Evening Lectures—was delivered by Prof. ARCHIBALD BARR. The Hon. R. C. PARSONS presided, and in introducing the lecturer, said that it was necessary young people should go deeply into the theory of mechanics before undertaking practical engineering as the business of life. Prof. Barr said both theoretical and practical knowledge was necessary for success, and those who would gain high places in the craft must have scientific training, manual dexterity, and extensive and varied experience—experience only attained by observation and a mind always active in watching the effects of different modes of procedure upon results to be attained. It would be his duty in what he had undertaken to impart a knowledge of scientific principles. The general principles upon which rules of operation were based would be explained. A knowledge of both theory and practice would show why labour was made easier, and how much easier it was made. It was easy to sin against principles, and yet obey the command "Thou shalt not be found out." It was hazardous to trust designing to men devoid of extensive experience or knowledge of principles. The engineer who did not wish to go forth into untried schemes took a poor view of his life work, though as a matter of fact there were many who did nothing to help on the world's progress in relation to this particular craft. Why had we so few like Watt, Stephenson, Siemens, and Bessemer? The strongest reason was that in rare instances was there that combination of theoretical and practical knowledge which would indicate what was wanted, and point out in what direction they should seek for its attainment. Why better results were not seen was because so few took the trouble to add to their knowledge of practice its complement of theory, or to add to their knowledge of the exact sciences what could be done in practice. The more acquaintance they had with scientific principles, the less would require to be done in invention by the expensive trial and failure method. Prof. Barr said that their first aim should be to become better workmen, more economical designers, more successful manufacturers, and more noted inventors. Still, he hoped they would find that underlying their daily tasks there was a groundwork of principles, the knowledge of which might be set alongside an acquaintance with any other science or art as an end in itself. As the result of the information he hoped to be able to convey in the present course of 20 lectures, the students would doubtless be in a better position to profit by the ever-recurring opportunities they had in their practical work of gaining a knowledge of the multitudinous details of engineering science.

In the coal mining department, Mr. ARNOLD LUTTON, who has just returned from the United States, gave a lecture on mining in North America. Speaking of the freedom of New York from the smoke nuisance, the lecturer said the citizens of New York had to thank the geological peculiarities of the great coal field of the Appalachian chain for this comparative freedom from smoke. This coal field was about 900 miles long and 170 miles wide, and contained beds of bituminous and coking coal over almost the entire area. These coals burnt with great volumes of dense black smoke. But New York was about 1000 miles from the farthest portion and 300 as the crow flies to the part where the coal was thickest and most easily worked. To reach this part the Allegheny Mountains had to be crossed and descent made into the watershed of the Ohio river. At the extreme north-east there were a few narrow strips in the upland valleys, which reached to within 100 miles of New York city. The coal here was anthracite, and the Lehigh River Canal afforded a cheap means of transit to the plains. Three-sevenths of all the coal used was anthracite. The production in 1882 was 29,000,000 tons. It was especially useful for the domestic stoves by which rooms were warmed, steam boilers, smelting, and for making illuminating gas; and this was extraordinary, as it had none of the characteristics of an ordinary gas coal. The coal when red-hot was decomposed by a jet of steam, and the gases so produced were afterwards mixed with hydro-carbon spirit, obtained from the refuse of paraffin, to give the necessary illuminating power.

The lecturer then described the remarkable changes that had taken place in the anthracite coal field and the manner in which the mines

were worked. He said there was a good deal of water to contend with. Though anthracite mines were not fiery, there was plenty of gas. In the ten years ending 1879 there were 679 explosions, killing 225 and wounding 1127 persons. The greater number of deaths were caused by falls of roof and miscellaneous accidents. The death rate during the six years ending 1879 was one for every 100,000 tons raised. In the United Kingdom it was one life for every 152,000 tons. In 1882, 80,589 persons were employed in the anthracite mines, earning on the average 7s. 3d. per day of ten hours. The wage for a hewer was 8s. 9d., except when on contract, when they made 12s. 6d., and for a labourer 7s. 6d. The bituminous fields were not yet explored, but there was coal in most of the States. Oil wells formed an important part of the mining industry of the States. Oil had been most extensively extracted in Pennsylvania: 12,000 men were employed in boring and attending them, and in 1882 3304 new wells were bored in Pennsylvania and New York States. There were 19,000 wells in these States in 1882, producing 82,000 barrels a day, and worth 4,750,000l. a year. The rapid boring was simply marvellous; a hole was put down 1500 ft. or 1600 ft. in two or three weeks, lined with piping and all in working order. The work cost about 200l. The lecturer explained the system of torpedoing which was carried on to increase the flow of oil.

California produced gold and a little silver, Colorado silver and a little gold. One-sixth of the entire silver production of the world was yielded by Colorado, and of this two-thirds was got at Leadville. Along with the silver was a great deal of lead: 600 acres in the last five years had produced 14,000,000l. worth of silver and lead. Only one-fourth this area had been fully explored. In 1882, 3700 miners were employed, the pay being 12s. 6d. for ten hours. A serious expense in mining here was caused by the quantity of water met with, and the expense of procuring fuel for the pumping-engines. In addition to gold, silver, and lead, Colorado had enormous supplies of iron and coal. Petroleum and salt, and also other minerals had been found, but only the more precious metals would bear the cost of transit. The production of all mines in the United Kingdom in 1882 was valued at 55,000,000l.; and for the same year that of the United States at 67,000,000l., though 1883 and 1884 would show a greater preponderance over England. Every day brought news of fresh discoveries of valuable minerals in the United States. Tin ore had been found, and copper in greater abundance than ever. Canada was now known to be rich in all kinds of minerals.

POVERTY.

That the propagation of the thoughts and arguments recorded in the invaluable little essays from time to time issued by Mr. James Platt have been productive of a vast amount of benefit to a very large number of readers is beyond question, and the new volume which he has now completed—*Poverty*. By JAMES PLATT, F.R.S. London: Simpkin, Marshall, and Co., Stationers' Hall-court—is from its excellent tone and thoughtful practical character calculated to do even more good to the community than any of its predecessors. Mr. Platt fully recognises the desirability of "Liberty, Equality, Fraternity" to start with, but does not admit the full socialist doctrine that in the subsequent race the active and energetic should be compelled to drag with them to the winning post the drunken, the improvident, and the criminal. He does not question the truthfulness of many of the premises of the sensational writers on poverty, but he demonstrates that their conclusions do not follow from the premises. He maintains that to improve the condition of the people is the most praiseworthy object of man's life, but he properly condemns "scientific charity," and recommends the poor not to be led away by those misguided enthusiasts who, instead of telling them why they are poor and how to remove the cause, tell them it is because they have been robbed of their rights. Beware, he says, of those agitators who try to allure you to your ruin by the phantom of State Socialism, and think seriously of the advice addressed by M. Edmond Scherer to the French Democrats:—"Do not imagine that one class is to be enriched by impoverishing others; instead of opposing the formation of private fortunes strive to increase the number of capitalists and proprietors; in like manner, instead of lowering public functions to bring them within the reach of incapacity, aim at drawing from the bosom of society all its inherent capacities, and at pressing them into the service of the State. In a word, let your establishment of social equality consist not in forbidding natural superiorities to assert themselves, or in forcing them down to the level of the general mediocrity, but, on the contrary, in favouring the manifestation and development of everything in the masses which is strong enough to rise above this level."

The suggestion that Mr. George ought to have lived in an earlier age of the world is no doubt fully justified. He tells us, says Mr. Platt, that "when wages are paid in kind—that is to say, in wealth of the same species as the labourer produces, as, for instance, if I hire men to cut wood agreeing to give them as wages a portion of the wood they cut—it is evident that no capital is required for the payment of wages." If the world's work could be done in this manner there would be some excuse for bringing up barter again, but it is utterly impracticable. Mr. George admits that capital is needed if "you do not choose either to sell or borrow," but prefer to go on accumulating stock. But he tells us that even for a Suez Canal "if the workmen were paid in kind (which if convenient might easily be done by paying them in stock of the company) then no capital for the payment of wages would be required." Mr. George only revives by this suggestion the exploded fallacy of labour notes, introduced by a good-hearted man to better the condition of the labouring class. You may take a horse to the water, but you cannot make him drink; you may pay labour by "tunnel notes," labour notes—call them what you like—but you cannot make a man take them for rent, clothing, food, &c. Does any sane man think that the working class would be better off if paid in labour notes, tunnel, or other stock, which they would have to waste time in bartering away to obtain the necessities of life, than by the present system, by which they receive from the capitalist their wages in money that has a recognised value, and will be taken anywhere by everyone?

Those who tell us, continues Mr. Platt, that "all wealth is due to labour, therefore to labour all wealth should go," not only overlook the fact that the result is obtained by the collective efforts of capital, skill, and labour, but that labour always gets its share, whilst the capitalist may not get any interest, and often loses the principal. For example, take the failures yearly, or productions like the Great Eastern; the labourer gets his wages, but the capitalist never gets his money back again; of what value would Great Eastern notes be had that costly vessel been built, as Mr. George suggests such vessels might be, without the aid of the useless capitalist? We are told that there is but one way to remove an evil, and that is to remove its cause. To this I heartily assent, but utterly differ as to the cause of the evil referred to, as I should protest against the remedy suggested even if it were the cause, the remedy being worse than the disease. That progress is due to labour we must all admit, but, as Mr. Platt says, we ought to give honour where it is due, and a little reflection will show that for the national progress of the last century we are not indebted to the working class. For our sake, for their sake, for the world's benefit, continued Mr. Platt, working men must be told the truth. Their part in the world's labour has been over-rated, and the part taken by scientists, inventors, the skilled brains to direct and manage (putting aside altogether the question of capital), has been underestimated. For the benefit alike of rich and poor we must recognise that nations advance by new knowledge, and that the public welfare is dependent upon the nation's mental and moral advancement, which depends upon new ideas, and the chief source of new ideas is original research. Why has this nation made such rapid progress during the last century? Principally by the subservience to useful purposes, by means of invention, of the new truths discovered by scientific men, which has enabled us to utilise our abundant stores of coal and iron ore in steam-engines, machinery, &c. The nation does not recognise its indebtedness to scientific men.

In the Concluding Remarks Mr. Platt observes that in the Globe of Dec. 12, 1883, it was stated that the Rev. Stopford Brooke had on the preceding day, at Bloomsbury Chapel, preached on the subject of the "outcast poor of London." He was reported to have said

that "among the very poor of London wages had already been lowered to the starvation point—3d. a day for 12 hours' work was not uncommon wage, . . . also that when large masses of men, both in town and country, were banded together by common self-interest to keep and get property that for the essential well-being of the State ought to be divided among the many, then he saw no cure but legislation." Disbelieving alike in any man working "12 hours for 3d. per day," "or men massed together" to keep up rent I wrote, enclosing stamped envelope for a reply, asking for the rev. gentleman's authority for both statements. I had no reply. After waiting a week I wrote to the Globe; my letter was not inserted. You can draw your own inference; mine is, that this and statements of a similar nature are mere clap-trap sensational announcements made to produce an effect.—Dec. 25, 1883: Discussing the subject with a friend, he said, "I have just sold some houses in Bermondsey, four-roomed houses, with open space in front and rear; the rent was 5s. per week, yet, although in one the husband and wife and two eldest sons earned a fair sum collectively, my 5s. weekly was only got after a deal of trouble." Mr. Chadwick, in a letter to the Times, Dec. 2, 1883, argues that it is the miserable dwellings that make the poor drink; and he supports his argument by stating that he asked one of the occupants of a miserable hovel what he earned weekly? "21s." was the reply. "Will you explain how you spend the sum?" Details were given up to 11s.; then he stopped. "How do you spend the other 10s.?" "In whisky," was the reply. Mr. Chadwick expostulated. "Oh," said the man, "if you lived in such miserable surroundings you would spend 10s. per week in whisky also." The reply satisfied Mr. Chadwick, but it indicates to me that the man was compelled to live in such a miserable hovel not because of his poverty, but because of his reckless waste of half his earnings." It was not the dwellings caused the drink, but the cost of the drink that compelled him to live where he could live at the cheapest rate.

Throughout the volume Mr. Platt gives abundant evidence of having carefully and thoughtfully weighed every statement which he either combats or supports, and of having, at the same time, treated those opposed to his views with the utmost consideration and courtesy. His book cannot be read without benefit to the reader. Poverty, its causes, and remedies is, as he truly says, a subject of interest to all, and one that is to be made understandable by all if we study the game as it is now played, and introduce truth in place of colourable impostures and delusions. The book is one which for the benefit of all classes cannot be too widely circulated.

PROPOSED GEOGRAPHICAL SOCIETY FOR MANCHESTER.

A meeting was held in the Mayor's parlour, at the Town Hall Manchester, on Oct. 15, for the purpose of constituting a Geographical Society for Manchester. The Mayor (Mr. P. Goldschmidt) presided, and there was a very large attendance. The MAYOR said it was a matter of surprise to him that we as a maritime and colonising nation had not more societies devoted to geographical research. So far as he knew there was only one such society in this country, while France and Germany had many. Referring to the labours of Grant, Speke, and Livingstone, he said that they might however boast with justice of the quality, if not of the extent, of the work done by England. He would point out to practical business men the importance, from a commercial point of view, of the subject. Any movement that tended to find new markets for their manufactures deserved their support, and it would be for their interests to devote their best energies to the discovery and development of foreign markets. A knowledge of the countries where those markets were to be found was the first step towards this end. The attempt made in 1879-80 to form a society of this nature had failed, but they hoped that this second attempt would be more successful. The main objects of the society were to popularise the study of geography; to spread, especially among the commercial public, the knowledge already possessed and to be obtained from Blue-books and similar sources; to combine with similar societies in promoting the exploration of unknown countries; to arrange for the formation of settlements for the promotion of trade; and generally to encourage commercial enterprise in foreign lands, without, of course, interfering with the existing rights of their merchants.

Mr. J. F. HUTTON explained why the action taken by the Chamber of Commerce five years ago relative to the formation of a geographical society had not been more successful. They had sent out 2000 circulars, but in return had only received 130 promises of support, and it was felt utterly impossible to form the society unless they had a very large addition to that number. Referring to the Royal Geographical Society of London, he said that society had 3400 members, and an income of 7200l. per annum, with an additional Government Grant of 500l. The working of that society cost about 5000l. a year, and it was felt that with 130 persons only it was impossible for them to form a successful society in Manchester. The number should not be less than 500 or 600, who would take an active part in the work. It was also considered that at least 10 or 12 leading merchants of the city should give a good deal of time to the society to make it a success. Mr. B. ARMITAGE, M.P., was very happy to be present. He said as they were striving to get an extension of trade to various parts of the world he looked upon such a society as that now contemplated as being of the most helpful character, and as contributing if not to our immediate certainly to our future benefit.

In proposing "That the Manchester Geographical Society be now established," the Bishop of SALFORD said he thought they should follow the societies of Antwerp and Paris, and publish periodically extracts from consular reports and geographical information. These he thought, if they could be easily brought to hand, would be of great use to persons engaged in trade.

Mr. SLAUG, M.P., seconded the resolution, and said we could not afford to be behind hand in any matter which added to our information as to foreign countries and foreign markets. Speaking of the consular reports referred to, he said, some of them were not, perhaps, aware of the large amount of useful information that was contained in those consular Blue-books, which were cast aside, he was afraid, by a great many members of the House of Commons without the slightest comment or regard. There was a fear with some merchants that the society might convey to the public secrets that they had got hold of which were valuable to them, but he thought that there was sufficient matter to publish altogether apart from intruding into private business affairs of their fellow-traders, and information which he ventured to say would be useful to them all. He urged upon them the great importance of this matter. The resolution was passed, and a provisional committee was appointed to prepare rules to be submitted at the next meeting.

HUNGARIAN GOLD AND SILVER REDUCTION WORKS.—Some important particulars concerning this undertaking have been published in the German papers. The *allgemeine oesterreichische Chemiker-und Techniker-Zeitung* states that in the public hall (Sprechsaal) of the Pester Lloyd an announcement, signed by Mr. A. G. Snellgrove, has been posted up giving formal notice that Kolo-man Count Eszterházy, Emerich Count Zichy, and Martin von Daniel have ceased to be directors of the said company (ungarische Gold-und Silber-Amalgamirungs-Gesellschaft) as and from Aug. 19 last year, and that Chevalier Henry de Mayne was on the same day removed from his office. The latter gentleman has since left the country.

BAGWORTH COLLIERY COMPANY.—A first and final dividend to the debenture holders herein will be paid on Monday next or the following Monday at the offices of the Receiver, Coleman-street Buildings.

HOLLOWAY'S PILLS.—With the darkening days and changing temperatures the digestion becomes impaired, the liver disordered, and the mind despondent unless the cause of the irregularity be expelled from the blood and body by an alternative like these pills. They go directly to the source of the evil, thrust out all impurities from the circulation, reduce distempered organs to their natural state, and correct all defective and contaminated secretions. Such easy means of instituting health, strength and cheerfulness should be in the possession of all whose stomachs are weak, whose minds are much harassed, or whose brains are overworked. Holloway's is essentially a blood-purifying medicine, whereby its influence, reaching the remotest fibres of the frame, effects a universal good.

FOREIGN MINING AND METALLURGY.

It would be rather difficult to define with precision the condition of the household coal trade in Belgium. As regards industrial coal, there is scarcely any change to report. In the week ending Oct. 12 the number of trucks carrying coal and coke which passed over the Belgian State Railways was 17,952 tons, as compared with 20,066 tons in the corresponding week of 1883, showing a decrease of 2114 tons this year. As regards the prices current for household coal, if there has been an advance it has at any rate not been general. Prices have been rather weaker in the Couchant de Mons than in the other districts of Belgium. Upon the whole, the winter may be said to be opening out favourably for the Belgian coal trade. Contracts have been let this week for about 10,000 tons of coal required for the Belgian naval service at Ostend. Deliveries have been made actively in Westphalia of late; for the moment, indeed, colliery proprietors have had to complain of an insufficient supply of trucks. Consumers of industrial coal have at the same time shown a disposition to wait before giving out large orders. Coking coal and coke have remained depressed in Germany; prices have not varied, however, of late. The production of coke in the Dortmund district in August was 210,823 tons; the sales effected in the same period were 210,707 tons. The stock remaining on hand at the commencement of September was 6461 tons.

No change of importance has occurred in the Belgian Iron Trade. The general aspect of affairs is as dull and depressed as ever. English casting pig and Luxembourg pig has been held in Belgium at about 27. 2s. 6d. per ton. Charleroi casting pig has made 27. 14s. per ton. It is stated that contracts have been concluded this week in Belgium for No. 5 Longwy pig; the price, if we are rightly informed, is 17. 18s. 9d. per ton at the producing centres. The statement appears to be scarcely supported by the probabilities of the case, as casting pig from the furnaces of the Belgian Luxembourg is only quoted at 17. 18s. 4d. per ton, the conditions of transport being about equal. No. 1 iron has continued to make 47. 10s. per ton upon home account, and 47. 12s. per ton for exportation. No. 2 has made 47. 16s. per ton, and No. 3 57. 2s. per ton. These quotations have been maintained with moderate firmness. Girders have been dealt in at 47. 16s. to 57. per ton, and plates at 67. 4s. per ton. There has, it appears, been a rather active movement in the last mentioned articles. The Marcinelle and Couillet Company announces that the external demand having been pretty well sustained during the company's last financial year, the production of its works was not diminished in the course of that period. The company's rolling mills turned out 32,797 tons in 1883-4. The construction workshops made 87 locomotives during the year, 66 on foreign account.

It is regarded as rather a bad sign of the times at Paris that contracts for merchants' iron have been concluded for almost the whole of next year at 67. per ton. It is believed, however, that the downward tendency in prices has reached its lowest point. It is announced that the Aire Company, in the Pas-de-Calais, has concluded a contract with the Northern of France Railway Company for the supply of 30,000 tons of steel rails to that concern. The rails are to be delivered in three equal instalments, at 57. 16s. per ton, in the course of 1886, 1887, and 1888. A company is now being formed at Mauberge for the manufacture of fixed and portable engines. A delegation of a commission appointed to enquire into the condition of French industry has been sitting this week at St. Etienne. The President of the Local Chamber of Commerce in addressing the commissioners observed—"The colonial régime is unsustainable. In 1873 we exported iron to Algeria to the value of 60,000*l*. Last year the exports declined to zero. Belgium furnished all." In the Rhenish provinces and Westphalia the market for pig-iron has not yet participated in the improvement which appears to be setting in in the German iron trade. The manufacturers of trucks have not sufficient work, and it is feared that they will have to reduce their staffs. The German engine-works are in a somewhat better state.

AMERICAN NATIONAL CHARCOAL IRON ASSOCIATION.

The National Association of Charcoal Iron Workers met at St. Louis, Missouri, on Sept. 30. President W. H. LEE opened the session with a brief address, in which he spoke of the depressed state of the iron trade, and said what they had to do was not to restrict production, but to cheapen it so as to meet the existing market. After summarising the iron trade statistics of Great Britain and the United States he congratulated the Association on the progress it had made and suggested the propriety of enlarging its scope, so as to include all branches of the iron and steel trade, a suggestion which was subsequently referred to a special committee to consider. Mr. John Birkinbine (secretary) presented reports showing the society to be in a very satisfactory condition both financially and in other respects. Mr. J. C. BAYLES, of New York, read a paper "On the Grading and Warehousing of Pig-Iron in Great Britain," in which he described the different systems in use in Scotland, in the Middlesbrough district, West Cumberland, Shropshire, Staffordshire, Derbyshire, and Lincolnshire districts. He also spoke of the warrant system of warehousing, and brought an able and exhaustive paper to a close by stating that he felt, looking at the whole subject from every point of view, profoundly impressed with the fact that the welfare of their iron trade would not be promoted by the warehouse and warrant system, at least under existing conditions, and that so far as gradings are concerned they seem to have nothing to learn from English practice.

The next paper read was by Colonel GEORGE B. WISTLING "On the Sunday Stops at the Mont Alto Furnace." The author described the furnace and the process of charging during the initial stages of the blowing in, his object being to show with what sort of furnace, and under what conditions the over Sunday stops had been practically tested. The furnace seemed to go all the better for the period of rest. On one occasion it remained banked from Saturday night until Thursday noon, a period of 190 hours, and then started off on cold blast iron without any difficulty. Colonel Wistingling thinks that continual blowing is by no means a necessary condition of good working, but that the record of furnaces which stop on Sunday is better than that of those which do not. A discussion followed, in which several favoured the views held by the author. An interesting paper was read by Mr. M. N. LILLENBERG "On the Position of Swedish Charcoal Iron in America." Although the quantity of Swedish iron products imported into America is of small account compared with the large masses made in the country, the steady increase of their total value is great enough to attract the attention of American charcoal iron makers. Several large manufacturers in America depend entirely and others partly on the importation of Swedish iron, and the increasing demands on its good qualities imposed by improved machinery, and called forth by sharp competition, have of late made the Swedish iron industry subject to a close observation by Americans. Swedish iron has in this country a position different from other imported irons, and is not to be put on the same level with them. The number of its uses is greater, and its importance, therefore, more elaborate.

Some experiments in charcoal ironmaking at the Shelby furnace relating especially to the better preparation of the ore, and the more improved economical heating of the blast, were described by Mr. J. A. McARTHUR. In the preparation of his ore he uses a modification of the Bradford washer, consisting of two cylinders working side by side, which have together a capacity of 200 tons per day. The cylinders do not revolve in water troughs, but are supplied by means of pumps. Mr. McArthur claims a good economy and satisfactory results in operation, washing removing at least 10 per cent. of dirt from the ore. With this apparatus he has been able to recover 30 or 40 tons of good ore a day from the dump where it has been thrown as useless. Descriptions were also given by Mr. George W. Colley of a new roasting apparatus; by Mr. George Noble of his method of making charcoal from yellow pine in meliers; and by Dr. H. M. Pierce of experiments relating to the making of charcoal, and the introduction of steam into the kilns during carbonisation. As usual, excursions to neighbouring mines, quarries, and works were largely patronised by the visitors after the business of the Association had been transacted. These were very enjoyable and instructive, and altogether the meeting of the Association was a most successful one.

PROMOTION OF PUBLIC COMPANIES.

HOW TO OBTAIN DIRECTORS.

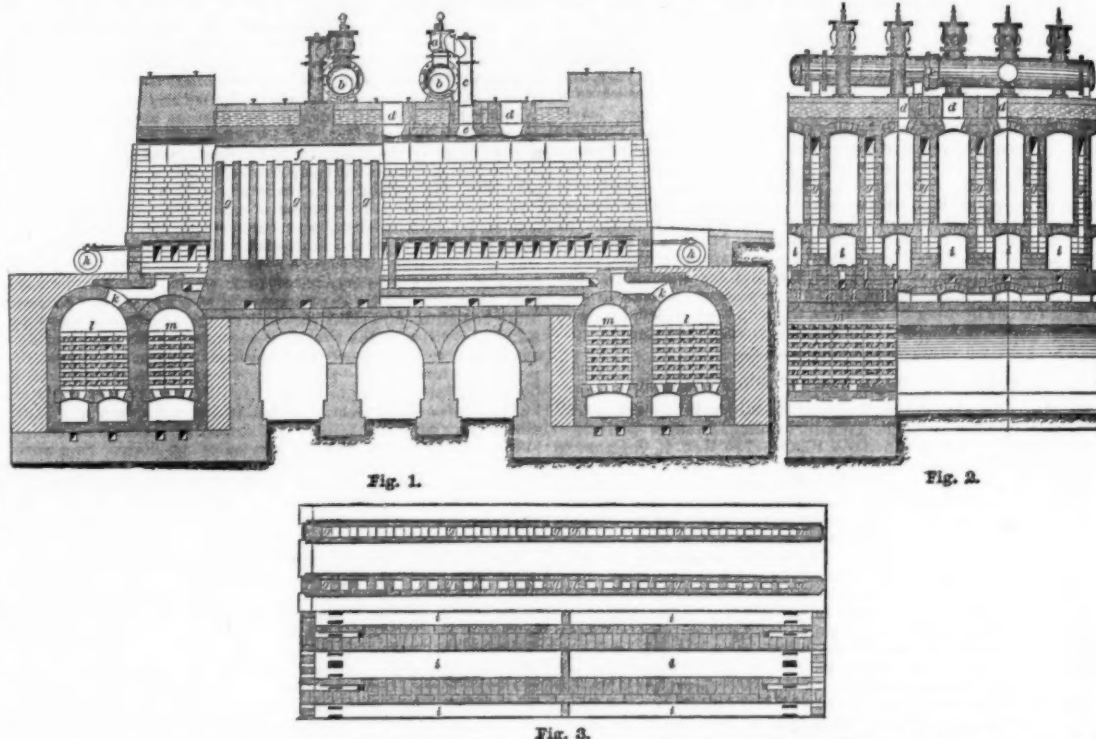
An interesting case, inasmuch as it affords some indications of what goes on behind the scenes in the formation of public companies, was heard in the Lord Mayor's Court on Oct. 18, before the Recorder and a special jury; it was the case of Skinner v. Frere, Forster, and Co., in which the sum of 2000*l*. was claimed for services rendered in connection with the promotion of a public company. Mr. Arthur Collins, Q.C., and Mr. L. D. Powles were counsel for the plaintiff; Mr. Kemp, Q.C., and Mr. Lyon represented the defendants. In opening the case Mr. Collins said the plaintiff was a commission and financial agent in the City, and the defendants were a well-known firm of solicitors in Lincoln's Inn-fields. The action was brought in respect of the forming and floating of the National Agricultural Hall Company, in which the defendants were to a very considerable extent interested. In May, 1883, their managing clerk, Mr. Fabling, and another gentleman, Mr. Yeoman, met the plaintiff and asked if he would undertake the floating of the company in question. Mr. Skinner consented to procure directors and vice-presidents for the venture. His office in the City was for some time used as the office of the company, and he had devoted a good deal of time and trouble to its affairs, besides incurring some pecuniary expenses. The land to be bought for the company was at Kensington; and according to the original agreement the vendor was to be Mr. Maturin, of Leicester, who was to pay 40,000*l*. for the land and resell it to the company for 52,000*l*., the balance of 12,000*l*. going towards the cost of floating the concern. As the plaintiff had no knowledge of Mr. Maturin, he asked to whom he was to look for payment for his services, when Mr. Fabling said, "You need not fear about that. You know Frere, Forster, and Co.; you can trust to them, and I will see that you are paid." It was then agreed that out of the 12,000*l*. the plaintiff was to receive 2000*l*.

After an unsuccessful attempt to form a syndicate, the plaintiff had nothing more to do with the company, nor had Mr. Maturin; but another vendor, who was to sell the land to the company, was found in Mr. Hunt, a clerk in Somerset House, and the sum of 52,000*l*. was, the learned counsel supposed, duly paid. At all events, Mr. Fabling always assured the plaintiff that he would be paid after the shares were allotted, and though these preliminaries were completed in June last, he had not received a single farthing. In his evidence, Mr. Henry Skinner, the plaintiff, stated that in fulfilment of his bargain he had secured as directors Sir John Humphreys, Mr. Alderman H. J. Waterlow, Mr. Beach, M.P., and Mr. Wentworth Cole, and these gentlemen were acting on the board now. He also

obtained several noblemen and gentlemen to act as vice-presidents. It was through his own exertions mainly that the syndicate was started. He always considered that the defendants were responsible. The company was still in existence. Evidence was then given of the steps taken to form a syndicate. For the defence, Mr. Kemp submitted that there was no case to go to the jury. The defendants were only solicitors to the company, and did not admit any liability whatever as regards the plaintiff. His Lordship said he could not stop the case. Mr. G. D. Yeoman was then called and admitted meeting the plaintiff with Mr. Fabling; but Mr. Fabling never, in his presence, promised to pay the plaintiff anything. The plaintiff was to receive nothing at all if the company were not floated, and a stipulated sum to cover expenses if he succeeded in floating it. Mr. Fabling was also examined, and denied that he, as representing the defendants, ever promised the plaintiff 2000*l*. The defendants had charged their costs as solicitors, amounting to 1200*l*. but they had not yet been paid. In the result, the jury found a verdict for the plaintiff for 450*l*. Leave was given to move.

LECTURE ON IRON.—Mr. WILLIAM FARNWORTH, general manager for Messrs. E. P. and W. Baldwin, of Swindon and Wolverhampton, delivered a lecture on Tuesday last "On Iron; its early history, its progress, and its appliances." The Bessemer process was explained by the author with the aid of a diagram. Mr. Farnworth remarked that for the success of the enterprise at Spring Vale, near to Wolverhampton, which sought to utilise the local pigs in the making of steel, everyone who wished well to South Staffordshire was anxious, and the thanks of the district were due to Mr. Hickman and Mr. Gilchrist for starting so spirited a venture. Samples of basic steel and Siemens-Martin steel were exhibited. Speaking of the Ponsard system, Mr. Farnworth said that he went to Criel, 40 miles from Paris, to see the process at work. After a stay of several days he left with the conviction that, though the process might be theoretically right, yet that there were practical difficulties connected with it that made him prefer either of the two separate systems (Bessemer and Siemens-Martin) to be combined. After touching upon the fuel economy of the Gjers soaking pit and speaking of the Bessemer process as "most revolutionary," the lecturer held that that and the Siemens-Martin and the Thomas-Gilchrist processes were each and all triumphs of science that had laid the iron trade of the world under indebtedness, whilst they were inventions of which any people might be justly proud. Mr. Farnworth, in conclusion, recounted some of the manufacturing and social uses, great and small, to which iron and steel are being now put.

RECOVERY OF BY-PRODUCTS IN COKING.



RECOVERY OF BY-PRODUCTS IN COKING.

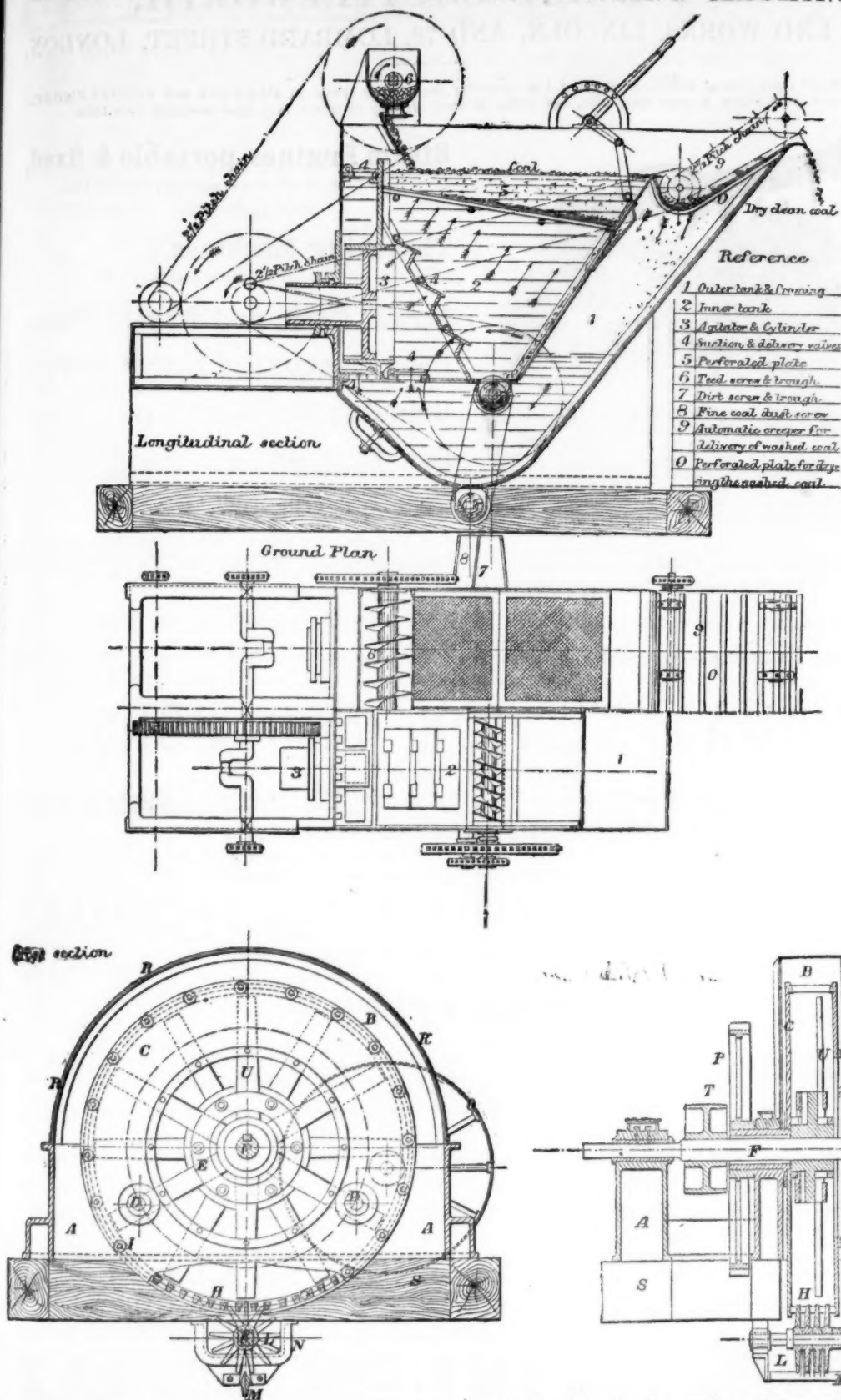
At the recent meeting at Chester of the Iron and Steel Institute an interesting paper was read by Dr. C. OTTO, of Dahlhausen, "On the Most Recent Results obtained in Germany in Utilising the By-Products from Hoffman Coke Ovens," and an illustration of the arrangement is now subjoined. Describing the oven, which he remarked was invented by Mr. Gustav Hoffman, of Lüssig, near Göttesberg, the author said that its essential features consist in the combination of coke ovens with the Siemens' regenerator in order to heat the air serving for the combustion of the gas to as high a degree as possible. The temperature necessary to maintain the coking process was obtained in common coke ovens by the combustion of the gases evolved in the interior of the oven, or of its side flues, and the hot gases escaping from the coal were burnt in the immediate proximity of their place of origin. If they conducted the gases coming out of the coke oven first through a condenser they lost their high temperature, and returned cold to the coke oven. It was only with coal containing very great quantities of gas that it was possible to obtain a temperature sufficient for coking by burning their cold gases with cold air. It was the object of most constructions to heat the air by which the gases were burnt to as high a degree as possible, in order to repair the loss of heating power which they had suffered by passing through the condensers, and it was equally the object of the system in question to bring air at as high a temperature as possible in contact with the gases. The hotter the air used in combustion the higher would be the temperature obtained in the oven.

In the above engraving the plant represented consists of a combination of Siemens' regenerators with ovens possessing vertical flues in the side walls. The dimensions of the ovens are those common with 9-meter ovens in Westphalia, a width of 600 millimeters, a height of 1600 millimeters to the spring of the arch, and the distance from centre to centre 950 millimeters. The principal points of difference between them and the ordinary ovens are the following:—In the latter there are openings in the coking chamber, from which the gases escape first into flues in the side walls, and then into flues in the bottom, where they are burnt with the aid of air brought into contact with them, with the object of heating the coking chamber sufficiently to carry on the coking process. In the Hoffman ovens there is direct connection between coking chamber and flues. Besides the discharging and the charging doors, *d*, closed during the working the oven has only two apertures, *e*, in the arch, from which the gases evolved during the coking process escape. A horizontal flue, *f*, connects the upper parts of all the vertical flues, *g*, in the wall. Every bottom flue is divided by a vertical wall, shown in Figs. 1 and 3, into two equal parts, *i*, each of which is connected with two regenerators placed side by side, *m*, being used to heat the gas, while, *l*, *l*, are reserved for heating the air used for the combustion of the heating gas. The regenerators are long flues filled with checker work, in order to get a large surface. They pass along the whole group of ovens, and at the end the two air regenerators, *l*, *l*, may be

connected by a valve with the air-pipe or the stack, and a similar arrangement is provided for the gas regenerators. When the ovens are charged, heated, and working, the gas from the coal undergoing the coking process escapes through the opening, *e*, into the pipe, *c*, and then into the pipe, *b*. The valve, *a*, makes it possible to cut off the connection between the oven and the condensing plant at will. The gas escaping from the oven is cooled in condensers and washed in scrubbers, through which tar and ammonia are collected. After the gases have passed the condensers and scrubbers they are forced by the exhaust fan that has drawn them from the oven to the condenser back to the oven to either of the two gas regenerators, *m*, according to the position of the valve. The air, which is forced in by a fan, enters the corresponding air regenerator. Both of the regenerators are connected by apertures, *o* and *h*, with the bottom flue, the combustion of the gas partly taking place in the latter. The entire current of burning gases enters into the vertical flues, *g*, flows into the horizontal connecting flue, *f*, and passing downwards into the vertical flue, *g*, of the other half of the length of the oven returns through the other half of the bottom flue through *o* and *h* into the other two regenerators, which they heat on their way to the chimney.

The results of working these plants are claimed to have been so favourable that there are now considerably more than 100 coke ovens with complete condensing plant in course of construction in Germany. It was explained by Dr. Otto that the combination of Siemens' regenerators with coke ovens was independent of the construction of these ovens, and could be applied to coke ovens on other systems. The tar contained less benzine than that produced in gasworks, but the amount of naphthalene and anthracene which it contained was equal to that contained in gas tar. It contained a smaller amount of light-giving elements than the gas supplied by gasworks, but in other respects its composition was the same. The gas which returned from the condensers was not all used in the coking process, and by the use of very large burners it could be applied to purposes of illumination in factories, iron or coal works, or for heating boilers, &c. For heating purposes it had the great advantage that it could be conducted to very great distances without suffering in quality. By the daily combustion of 2 tons 14 cwt. of coal per oven they could depend upon obtaining sufficient waste heat from every oven to heat 54 square feet of boiler surface. A heating surface of 54 square feet per coke oven corresponded with an evaporation of 1 lb. of water for every pound of coal coked. The trials were made with Westphalian coals, and he could not say whether or not these figures were surpassed by English coals. In Westphalia, with an ordinary coke oven, without extraction of the by-products, containing 5 tons 18 cwt. of coal they heated 80 square feet of boiler surface, or they evaporated 1½ lb. of water by every pound of coal coked. The gas produced by coke ovens lost less heating power in its passage through the condensers than they might have supposed, and they could not only extract the by-products but also heat boilers with the gas which had undergone this process, together with the highly-heated products of combustion which had passed through the air regenerator.

IMPROVED COAL WASHING AND DRYING MACHINERY.



IMPROVED COAL WASHING AND DRYING MACHINERY.

Coal mining and mining generally must in these times, in order to yield a fair profit, be carried on in the most economical way possible, and, therefore, the attention of engineers is being concentrated upon efforts to devise machinery for the treatment of the minerals which shall give the greatest results with the least expenditure of cost and labour. A machine for the washing of coal, having among the advantages over other systems these, that it is self-contained, that the cleaned coal is delivered practically dry, and that there is less loss of the finest coal or dust than with any other machine, has been patented by Mr. C. E. HALL, of the Standard Ironworks, Sheffield. It has been specially arranged for the tank and agitator or spout system. The action will be seen by reference to the accompanying figures. No 6 is a hopper for the reception of small coal, having a square shaft with a suitable horizontal feed worm working the coal across the width of the machine, and delivering it out through the bottom of the U-shaped trough by means of shuttles or doors fixed in the frame to regulate the quantity supplied to each "bash," marked 5. The tanks being filled with water, the washer is set in motion by a counter shaft and gearing, working a double throw crank, which reciprocates the two plunger pistons (3) in the cylinders, so that the water is drawn down the outer tank through the foot valves (4). A large delivery valve (4) allows the forward stroke of the piston to force the water through the valves into the inner tank and out through the perforated copper plate, upon which rests the dirty coal; but they close immediately on the return stroke, thus preventing any suction, and giving the greatest facility for the coal to float to the top, whilst impurities of greater specific gravity deposit themselves on the perforated plate. The continued pulsation, combined with the incline of the plates, causes the dirt to pass forward, and where a sufficient quantity has accumulated a valve is opened and it is delivered into the inner tank where it settles upon the dirt screw (7), and is wormed out into the dirt truck.

The chief feature of this machine, however, has yet to be described. The piston in conjunction with the outer and inner tank and suction and delivery valves maintains a considerable difference of level of water between the two tanks on both strokes keeping the inner or washing tank full, and the outer tank empty, as shown by the lines. This causes a suction under the finely-perforated delivery plate (O), which dries the coal instantly, and returns the water thus extracted by the next stroke to the inner tank. A continuous creeper carries away the dried washed coal over the lip. The finest coal and elimes are collected at the bottom of the outer tank, and by a screw driven forward into a tube where they form a solid column. Belts are entirely dispensed with, the whole being driven by patent chain gearing, also invented by Mr. Hall. It is claimed for this machine

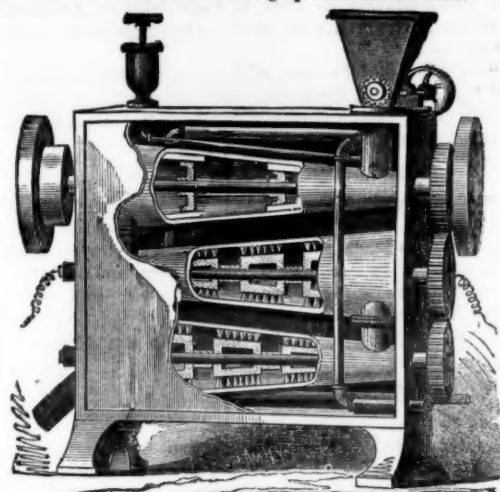
that it will wash considerably more than any other mechanical washer. The tanks are of wrought-iron, the pistons and cylinders of cast-iron, truly bored, and with stuffing boxes lined with gun metal. The delivery screws are on square shafts run in bearings with adjustable glands. The valves, which are of the simple weighted flap kind, are of ample area. The jigger plates are of copper, finely perforated and well stayed. The machines, which are at work and giving satisfaction, are automatic in every respect, self-feeding and self-delivery, and they use less water than any other mechanical washing machine in the market. It is also made in sections ready for erection at any colliery at home or abroad. As regards the advantages affecting the cost of burning coal in ovens, the coal comes from the machine sufficiently dry to grind and go direct to the ovens without loss of time, and there is less wear and tear to ovens, a lower temperature and less time being required with coal thus treated than when it is put wet into the ovens. Those who are thinking of purchasing coal washing machines would do well to examine carefully Mr. Hall's "Circulator" coal washing and drying machinery.

A machine for grinding coal has also been patented by Mr. Hall, called the "Excelsior," a diagram of which we give. A is the main framing of cast-iron, with a hollow girder passing round, upon which are cast the main bearings for the beater shaft (F), running in phosphor bronze, half brasses, with caps and bolts and suitable lubricators. B is a wrought-iron cover, to which is attached a wrought-iron feed hopper and shuttle. There are four openings in the cover at R, with lids for ventilating the mill casing. C is a wrought-iron circular cage, with grooves for segmental grates of steel, with bars of truncated V section. The two plates forming the sides of the cage are held together by suitable distance pieces (L), with nuts. D are two friction rollers secured to the main frame (A), upon which the cage rotates by means of a turned ring resting thereon on one side; the other side is supported in a bearing on the main frames by a long hollow-turned steel flanged boss, upon which is keyed a large spur wheel (P) for rotating the cage (C) by means of a pinion and pulley (O) and shaft at the outside. E is the centre boss, into which are fitted beaters (U). F is a steel shaft, upon which is keyed the driving pulley (T) and beater boss (E); H, segmental grates of steel; I, distance pieces or bolts; K, square shaft on which the star wheels (L) are fixed for keeping open the interstices of the grates. These are supported in bearings (N), and a toothed bar passes between the star wheels to clear them. The star wheels are driven round by the cage. O is a driving pulley for rotating the cage by its gear. These machines will grind 150 tons of wet coal a day, and it is besides claimed for them that they do not clog, that they are the only machines which will thoroughly mix coal as it is delivered from the washer and grind it, that they are low in first cost and free from future royalty, and that they are simple in construction, and all parts can be easily removed or repaired.

NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never need stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel mullers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamo electric machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—

- 1.—The saving of almost all the mineral passing through the machine.
- 2.—The loss being less than 10 per cent.
- 3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.
- 4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Sparey Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

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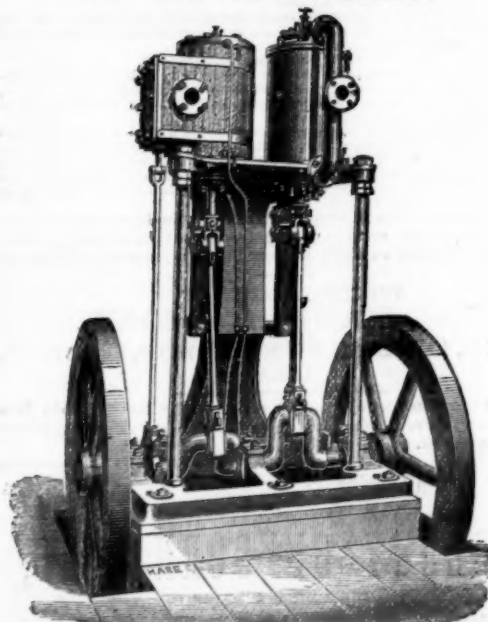
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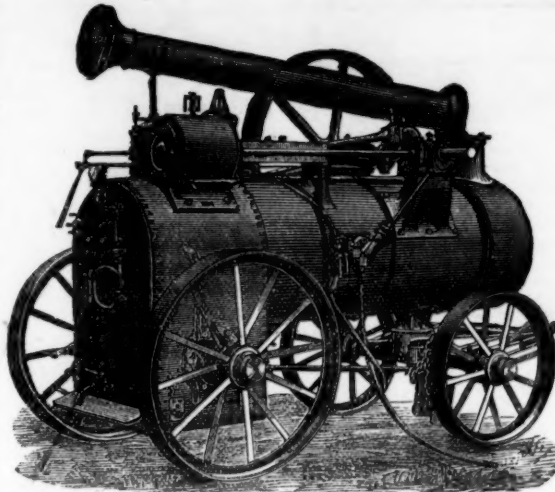
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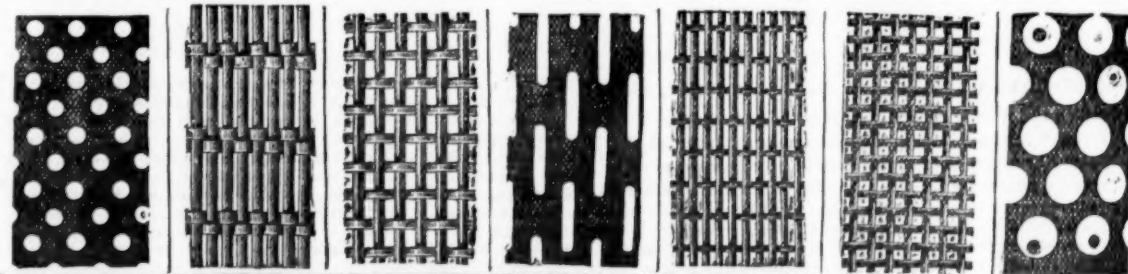
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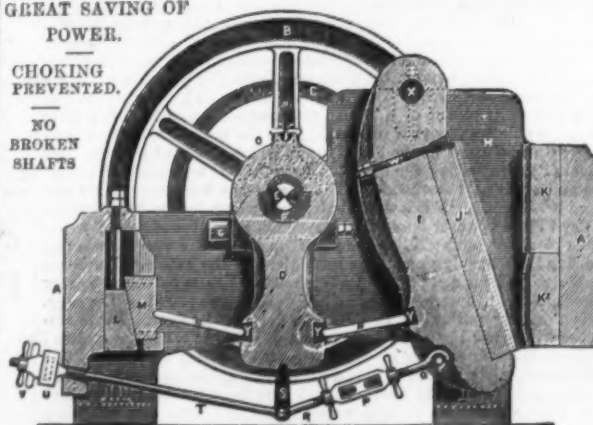
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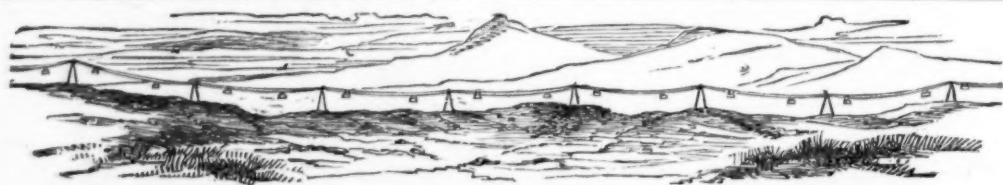
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"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone and bring it out like flour."

"In reply to your favour, I have much pleasure in informing you that the 12x3 Pulverizer we had from you is giving us every satisfaction. The material we are operating on is an exceptionally hard one. I am well satisfied with its working."

"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

"The reports from our mines as regards the working of your Fine Crusher (20x5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried by hand, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

"As I once before stated, your machine is a perfect pulverizer."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

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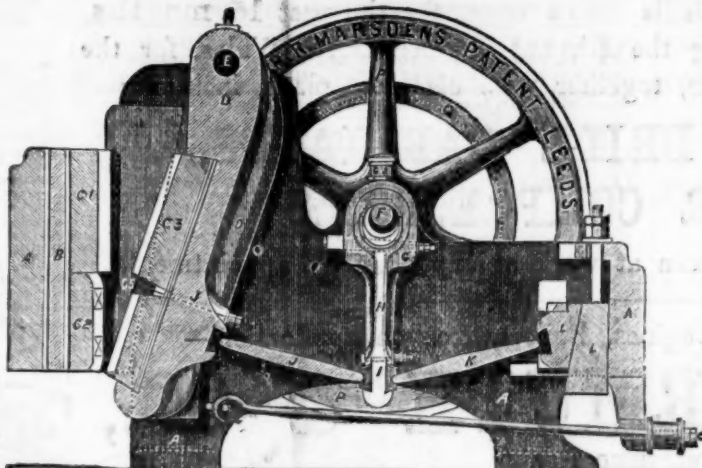
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"Some of your testimonials do not give your machines half the due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin capels (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."



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SPECIALITIES ARE HIS

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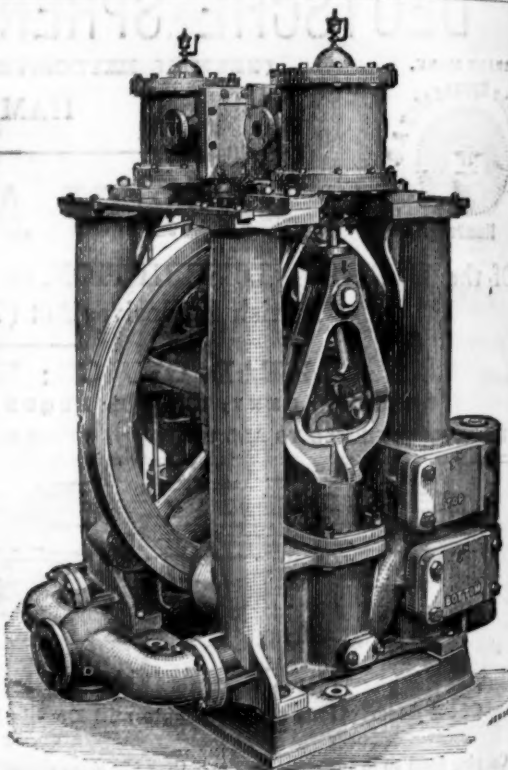
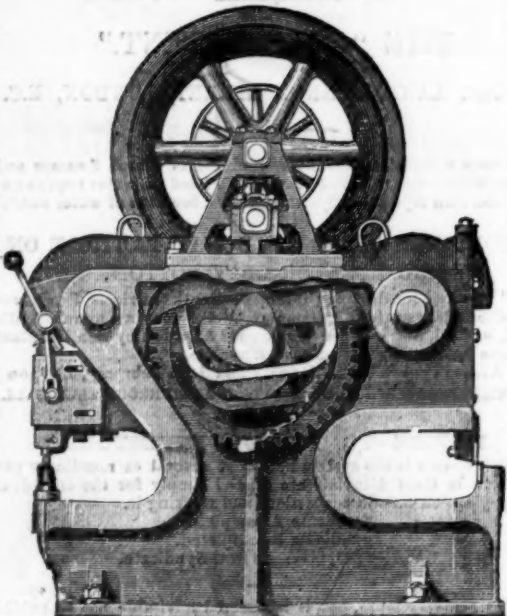
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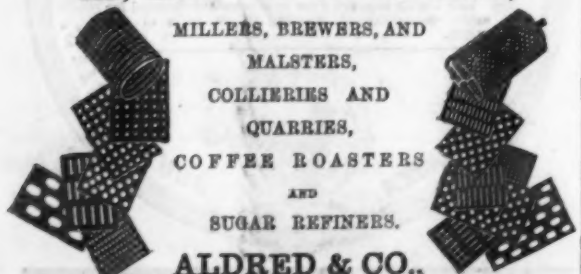
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